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THE REGIONS OF THE HUMAN BODY

— OSTEOLOGY



TOLDT

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AN ATLAS
OF
HUMAN ANATOMY
FOR STUDENTS AND PHYSICIANS

BY
CARL TOLDT, M.D.
PROFESSOR OF ANATOMY IN THE UNIVERSITY OF VIENNA

ASSISTED BY
PROFESSOR ALOIS DALLA ROSA, M.D.

Translated from the Third German Edition and adapted to English and American and
International Terminology

BY
M. EDEN PAUL, M.D. BRUX., M.R.C.S., L.R.C.P.

FIRST SECTION
A. THE REGIONS OF THE HUMAN BODY
B. OSTEOLOGY
(FIGURES 1 TO 377 AND INDEX)



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TRANSLATOR'S PREFACE

THE science of human anatomy is purely descriptive in its methods, the field it covers is not very extensive, and its boundaries are sharply limited; it is, therefore, one of the few sciences in which something closely verging on finality and completeness has been attained. Even, however, if no new anatomical data are likely to be forthcoming, there is yet scope for originality in the method of presentation of those data of which the science now consists; and originality of this kind Professor Toldt's "Atlas of Human Anatomy" exhibits in a high degree. In the many admirable manuals of human anatomy now extant in English, the illustrations, even when numerous, as they are often, and when good, as they are occasionally, form a mere supplement—usually a very imperfect supplement—to the text. Atlases of anatomy, and useful atlases, also exist in English, but all are quite fragmentary. Some, like the well-known and valuable, but somewhat antiquated, "Illustrations of Dissections," consist of a series of pictures of selected regions carefully prepared on the cadaver: these are models for the imitation of the student in his own dissecting work, but are not of much value for private study. Others, like Bellamy's English edition of Braune's atlas of frozen sections of the human body, present a small number of anatomical facts from a striking and unfamiliar point of view. But among English works, an accurate pictorial representation of *all* the data of human anatomy, carefully drawn to scale from actual specimens, and arranged suitably for systematic study, has hitherto been lacking.

Whilst a true knowledge of anatomy, a knowledge that will through life supply the needs of the physician and the surgeon in their practical work, can be obtained only in the dissecting-room, the student's labours with scalpel and forceps must be preceded and supplemented by systematic private study. Now, for this purpose, the textual descriptive treatise is not alone sufficient; or, if sufficient, it is so at an excessive expenditure of time and labour. Both in his work preparatory to dissection and in his revision of his anatomical knowledge subsequent to dissection, the energy of the student will be enormously economized if he has at hand a graphic representation of every structure named and described in his systematic treatise. An increased use of the visual or graphic method, both in the acquirement and in the revivification of knowledge, is a feature of the age in all educational departments; but this English translation of Professor Toldt's work is, as far as the English-speaking races are concerned, the first adequate application of the method to the study of human anatomy.

In speaking of the finality and completeness of anatomical science, one exception must be made, and this exception relates to anatomical terminology, which, though nearly completed, has not yet attained finality. Had there been a universal anatomical nomenclature—a nomenclature, that is, adopted by, or even fully intelligible to, anatomists of all nationalities—an English edition of this work would have been superfluous. Anatomy, however, like all other sciences, has suffered from the dispersion of tongues that ensued on the Renaissance, when the good and the evil of mediævalism became inextricably confounded, and were cast away together, and the inestimable gift of a language common to the learned of all lands was lost for ever. The German-speaking peoples have a fairly complete and fairly pure Latin anatomical nomenclature, needing, however, to be eked out here and there by the vernacular; whilst in England, as in France, a strange and bastard dialect, half Latin and half vernacular, has come into use. Uncouth jargon as it is, being current and familiar, it is not likely in England and America ever to be replaced by the more consistent terminology in use in the anatomical schools of Germany and Austria; I have, however, in this English edition of the "Atlas of Anatomy" retained the terminology of the original side by side with the English translation, distinguishing between the two by a difference of type.

In some cases, in the nomenclature used by the author, terms are met with which have no counterpart in English anatomical terminology: either because the author regards as normal a structure which English anatomists regard as a variety; or, and far more commonly, because the structure in question, though normal, is unimportant, and English anatomists have therefore neglected to name it. Sometimes, in such cases, I have given a literal English translation of the Latin name used by the author; sometimes, however, a periphrasis has been required to explain what the structure is, or to account for the absence of an English name, and this periphrasis, when lengthy, has been printed as a foot-note. In all such cases, an *asterisk* is prefixed both to the Latin name and to its English equivalent, to indicate to the reader that there is something unusual in the terms employed.

I must further point out that in a few instances the author's nomenclature actually conflicts with that commonly used in England, so that the literal translation of the author's name for a certain structure is applied in England to a structure totally different. For instance, what the author calls *canalis pterygopalatinus* is in England called the *posterior palatine* or *palatomaxillary canal*, while the *pterygopalatine canal* of English anatomists is called by the author *canalis pharyngeus*. But for this warning, beginners might imagine such divergencies to be due to carelessness on the part of the translator or to errors of the press.

A further difficulty has arisen from the fact that English anatomical nomenclature is itself not yet finally settled, nor even wholly consistent. Not merely is the same structure often known by several names; but, which is worse, the same

TRANSLATOR'S PREFACE

name is sometimes applied to two different structures. Reform is therefore needed, but it is not the part of a translator to undertake it, and I have perforce been content to follow the authorities. My leading authority has been the tenth edition of Quain's "Elements of Anatomy," but I have also had Macalister's "Text-book of Human Anatomy" in constant requisition. From these works I have, when more than one name is used to denote any structure, taken all those in common use, the order in which the alternative names have been printed showing most often the relative frequency of employment; in a few cases, however, where a name less commonly used has appeared to me distinctly preferable for any reason to an alternative name more commonly used, I have given the less usual but preferable name the precedence. To this small extent only have I been influenced by my own views in the matter of anatomical terminology; and, with the exception of those names which for the reason already furnished are preceded by an asterisk, all the terms in the English nomenclature are in use by one or more of the leading English authorities.

As regards the terminology employed in the United States of America, the contributions of the scientific investigators of that country to anatomy have, owing to the early perfection of this branch of study, been far less extensive than in the case of the other sciences ancillary to medicine; and the science of anatomy was for the most part taken bodily over, text-books, terminology, and all complete. A few differences, however, exist, and I have therefore collated my manuscript with that useful little work, Young's "Synopsis of Human Anatomy," and any divergent terms in use in America only have been inserted in my translation, and distinguished by the addition of the letters "U.S."

A considerable number of the references to the figures will be found to be in the English nomenclature only. These are either cases in which the English and the International descriptive terms were identical, and the printing of both was therefore superfluous; or else cases in which in the original the reference was wholly in German.

Measurements given in the original in centimetres have in all cases been reduced to inches. In illustrations of foetal parts the age of the fetus is given in months from the date of fertilization of the ovum. On the Continent, however, the period of utero-gestation is usually reckoned as ten "months" of four weeks each; not, as with us, as nine calendar months. To avoid mistake, I have in all such cases after the word "month" or "months" added in parentheses the words "months of four weeks each."

I cannot dismiss mention of the works of reference I have employed without alluding to the German-English "Dictionary of Medical Terms," by Treves and Lang—a book invaluable to all those engaged in the translation of German medical works.

Since this Atlas is intended for the use of beginners, as well as for that of advanced students of human anatomy and of practitioners of medicine, I may fitly conclude this preface with a few words on the general principles of anatomical nomenclature. For descriptive purposes the body is regarded as being in the upright posture, with the arms extended by the sides, and the hands fully supinated, so that the palms look forward. With this attitude kept in mind, the meaning of the terms *superior* and *inferior*, *anterior* and *posterior*, *external* and *internal*, is obvious. Sometimes, however, descriptive terms of another kind are used, to remove the confusion liable to arise from the adoption by man of an attitude different from that of all the other vertebrata, and to homologize the nomenclature of human with that of comparative anatomy. Thus, *cephalic* and *caudal* in comparative anatomy correspond respectively with *superior* and *inferior* in human anatomy; *ventral* and *dorsal*, with *anterior* and *posterior*. Dividing the body into right and left halves by a vertical *median plane*, which cuts the surface of the body at the *median line*, *medial* or *mesial* and *lateral* correspond respectively with *internal* and *external* in denoting position respectively nearer to, or more remote from, the median plane. Other terms in frequent use are *superficial* and *deep*, *central* and *peripheral*, *proximal* and *distal*; these are self-explanatory.

In some cases descriptive terms applied to portions of certain structures denote the relation of these portions to other structures, as when we speak of the *vertebral* and the *sternal* extremities of the ribs, or the *acromial* and the *sternal* extremities of the clavicle. Terms of similar import are *radial* and *ulnar* applied to structures of the forearm; *tibial* and *fibular* (or *peroneal*) of the leg; *palmar* and *dorsal* of the hand; *plantar* and *dorsal* of the foot; *flexor* and *extensor* of any of the extremities. It is to be noted that *internal* and *external* are sometimes used in a sense different from that previously explained, being employed to denote the interior and exterior positions respectively, either in relation to the general axis of the body or to the axis of one of its cavities. In this sense, for instance, we may speak of the *internal* and the *external* tables of the cranial vault, or of the *internal* and the *external* oblique muscles of the abdomen; but it is, as a rule, better to use the words *inner* and *outer* to denote this relation, and to reserve *internal* and *external* for position in respect to the median plane.

Finally we have to explain the terms used to denote certain directions, more especially the direction of certain sections: these are *horizontal* and *vertical*, requiring no definition; *sagittal*, denoting a dorso-ventral direction either in or parallel to the median plane; and *frontal* or *coronal*, which are synonymous terms, denoting direction in a transverse vertical plane.

The definition of many of the terms used in descriptive anatomy, such as *condyle* and *tuberosity*, *process* and *tubercle*, *sinus* and *cavity*, *ligament*, *tendon*, and *aponeurosis*, would be superfluous, since the student will best gain an accurate notion of their meaning by an examination of the structures to which they are respectively applied.

M. EDEN PAUL.

ALDERNEY, August, 1903.

REGIONES
CORPORIS HUMANI

THE REGIONS
OF THE HUMAN BODY

ERRATUM IN PART I. OF TOLDT'S "ATLAS OF HUMAN ANATOMY "

Page 59, note 1, line 8, for " zygomatic " read " sphenomaxillary. '

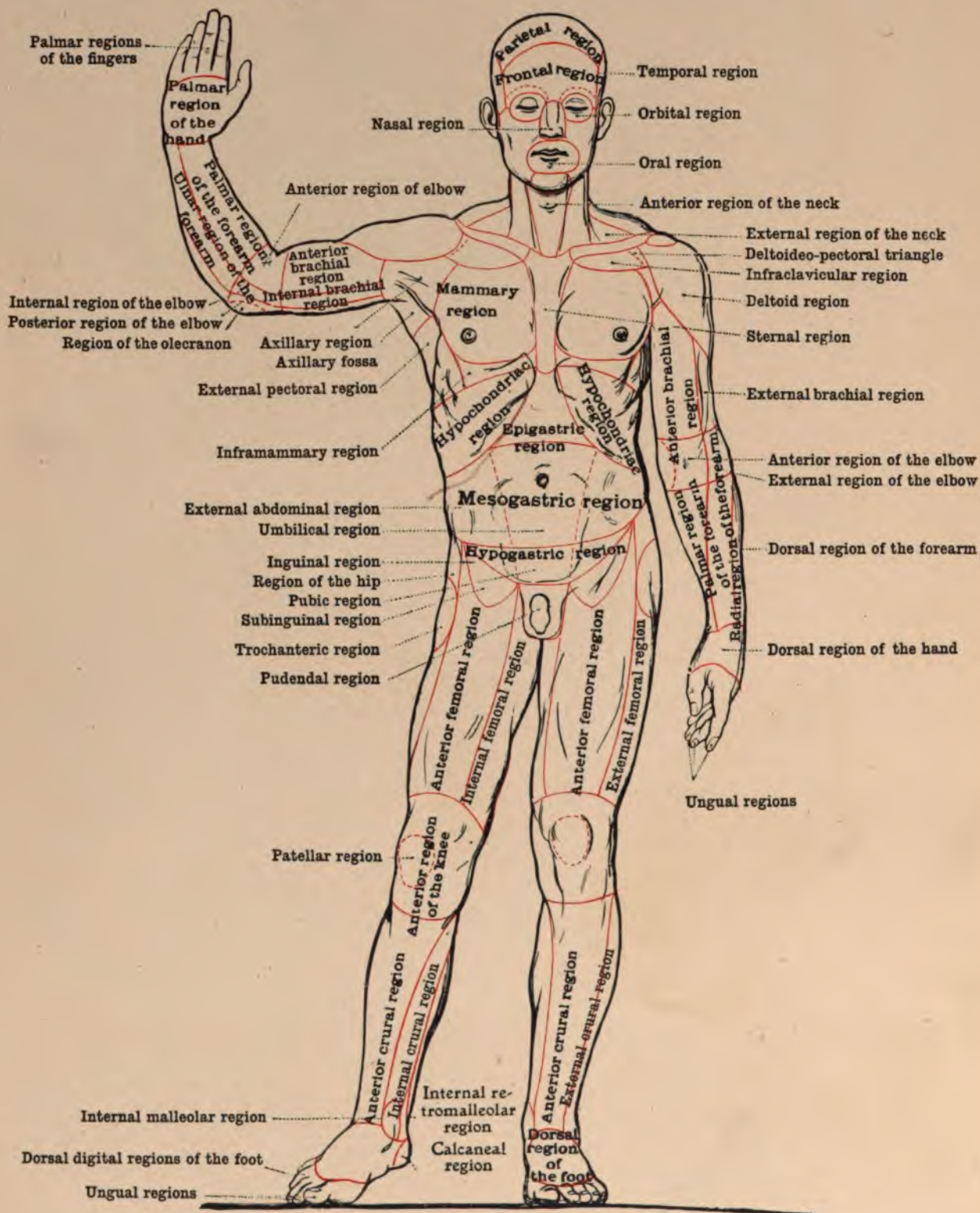


FIG. I.—ANTERIOR SURFACE OF THE BODY.

Regions of the Human Body.

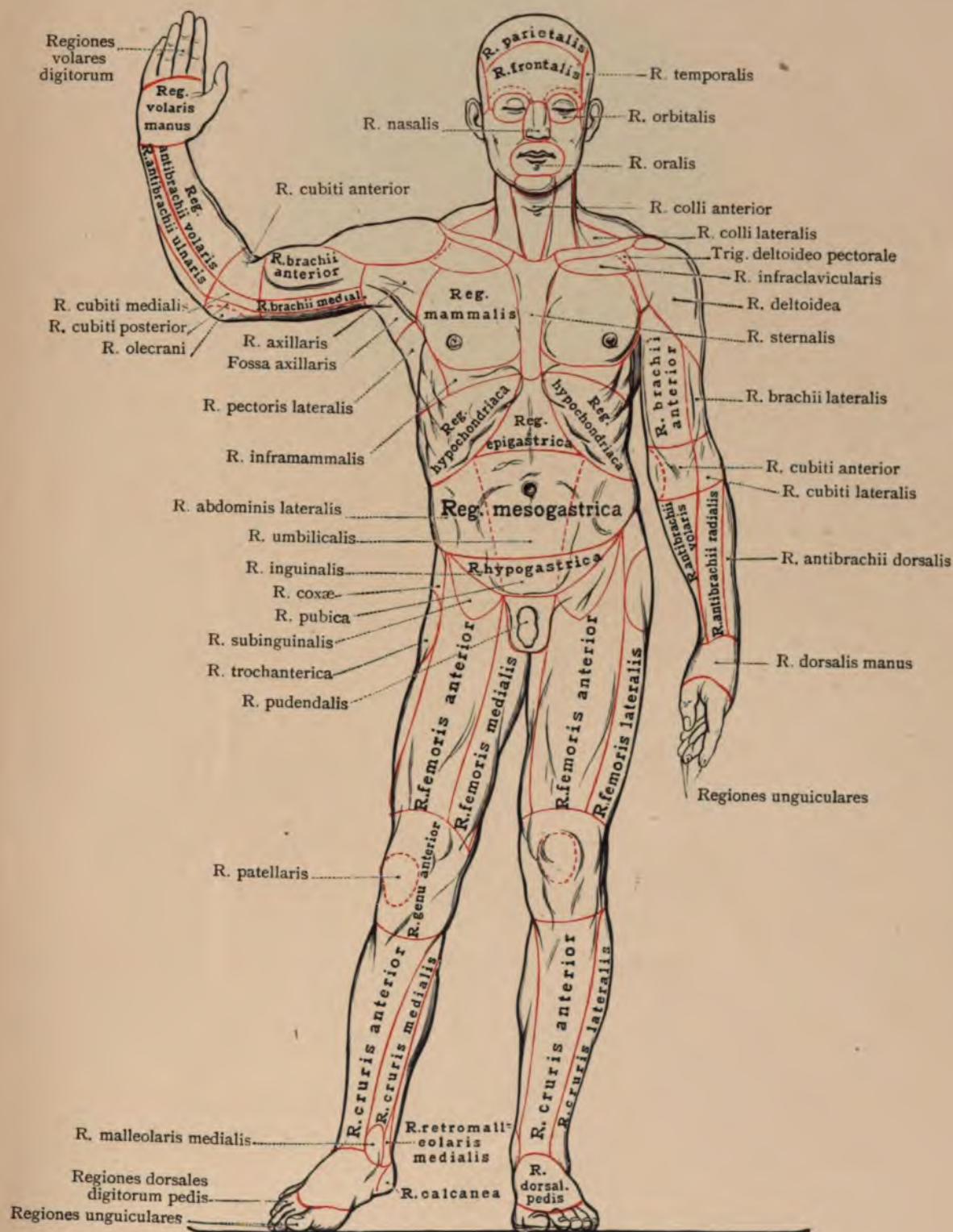


FIG. 1a.—ANTERIOR SURFACE OF THE BODY.

Regiones Corporis Humani.

THE REGIONS OF THE HUMAN BODY

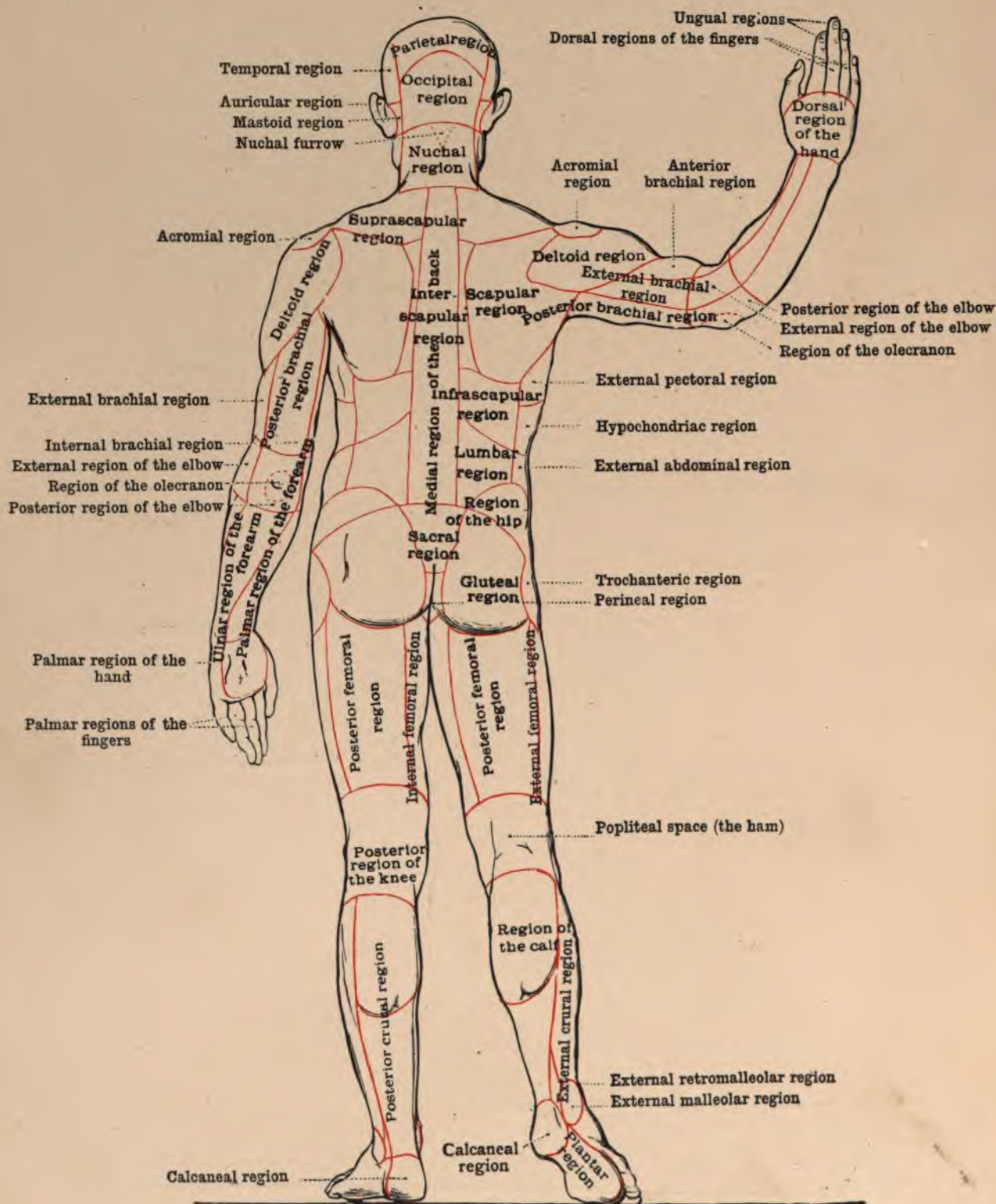


FIG. 2.—POSTERIOR SURFACE OF THE BODY.

Regions of the Human Body.

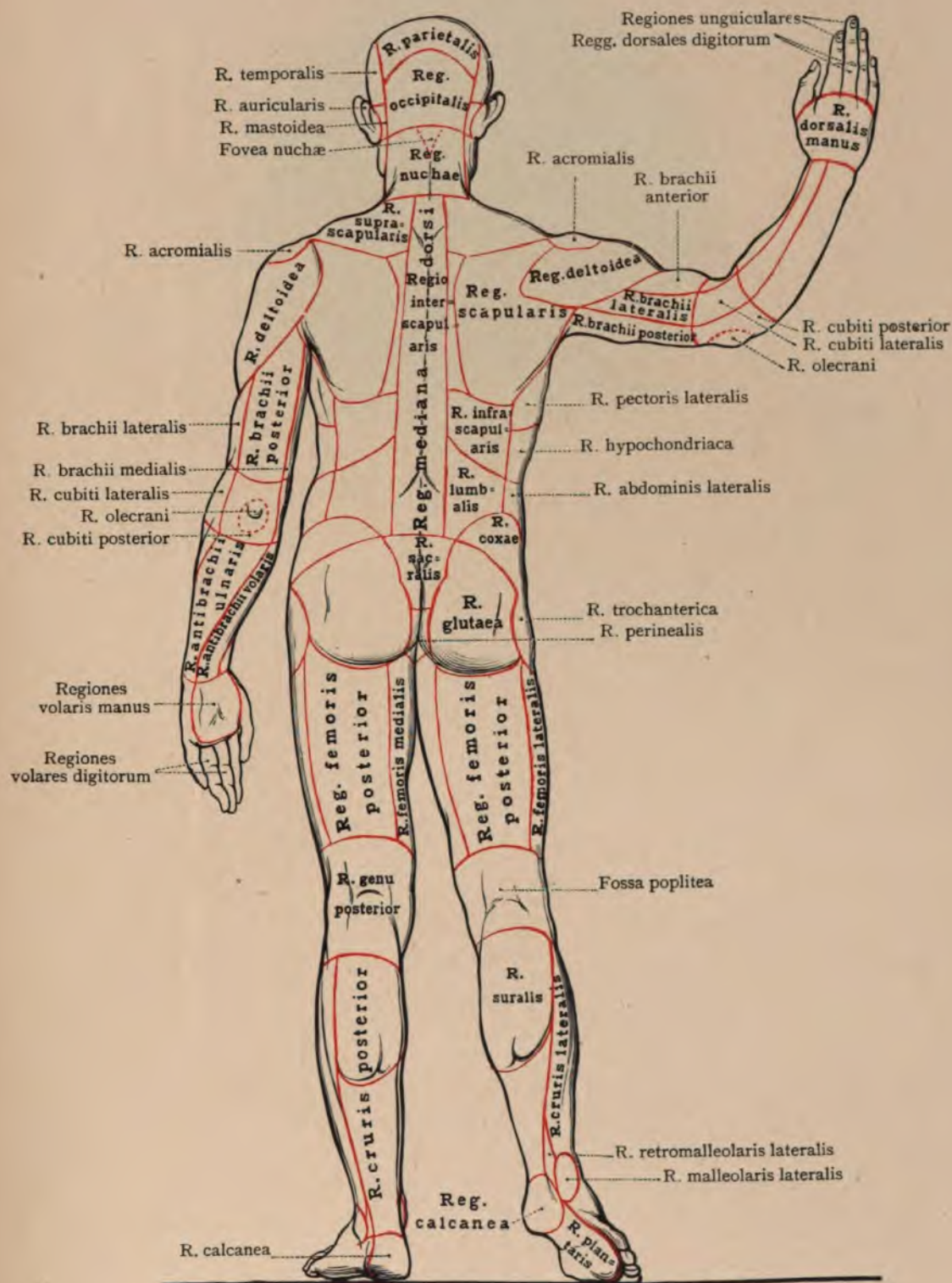


FIG. 2a.—POSTERIOR SURFACE OF THE BODY.

Regiones Corporis Humani.

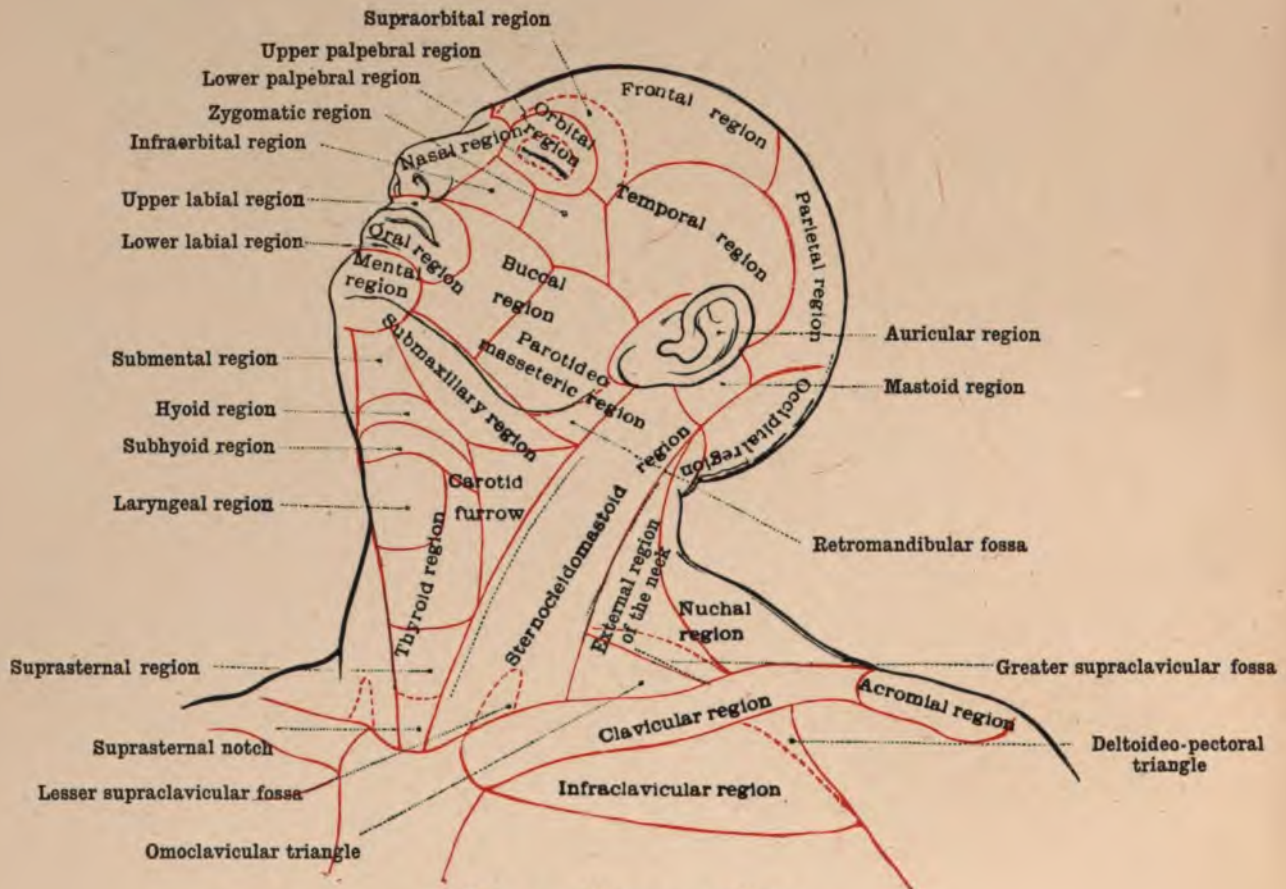


FIG. 3.—HEAD AND NECK.

Regions of the Head and Neck.

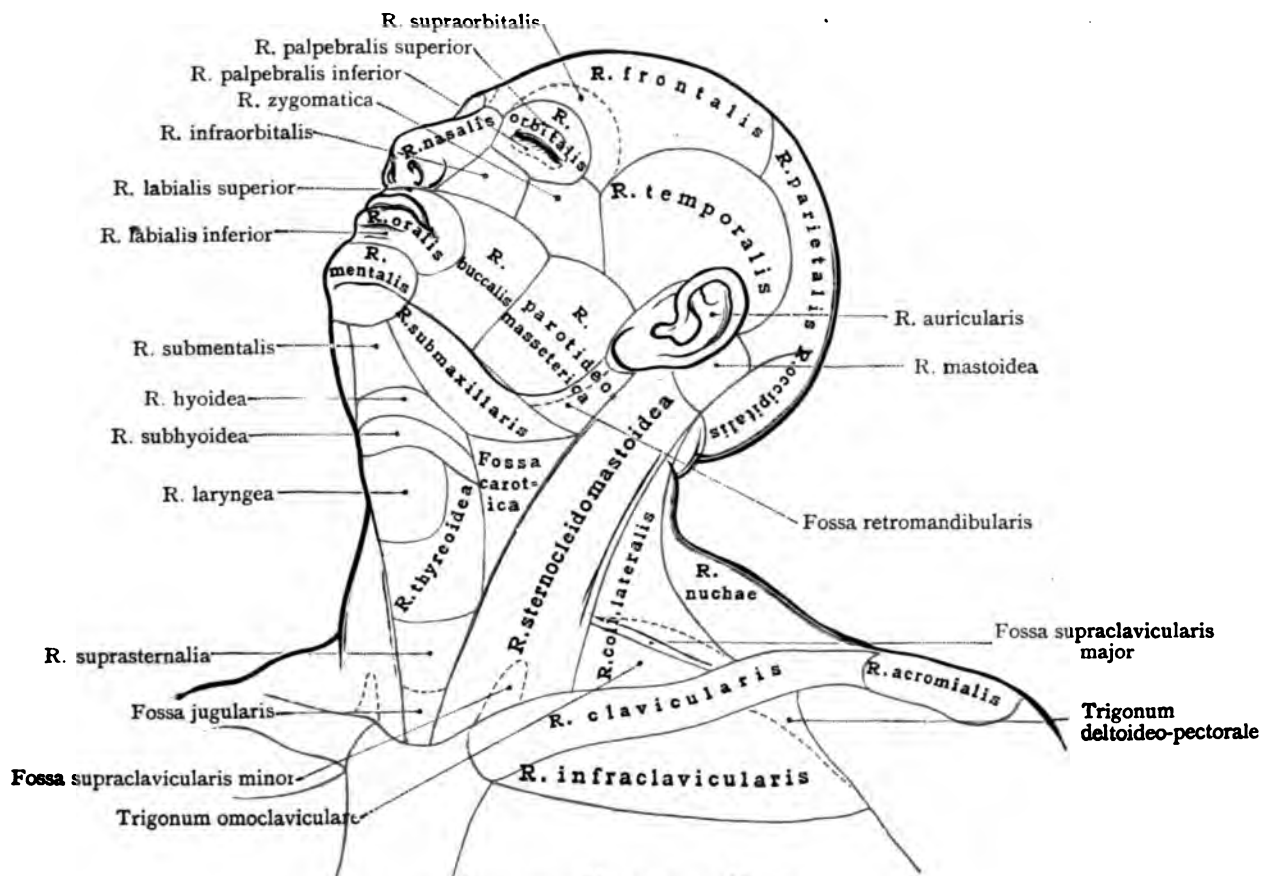


FIG. 3a.—HEAD AND NECK.

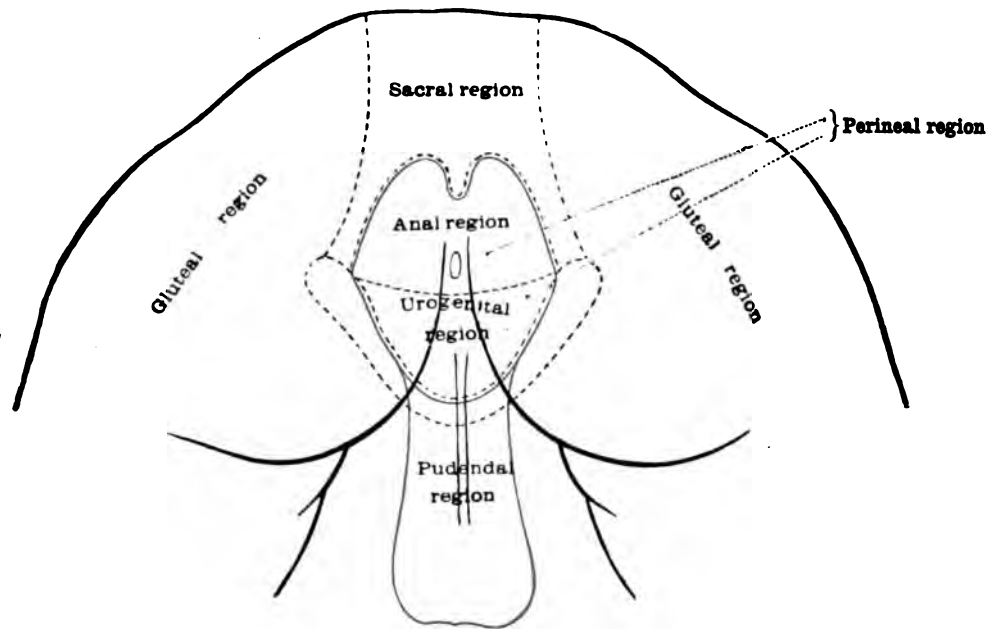


FIG. 4.—MALE PERINEAL REGION.

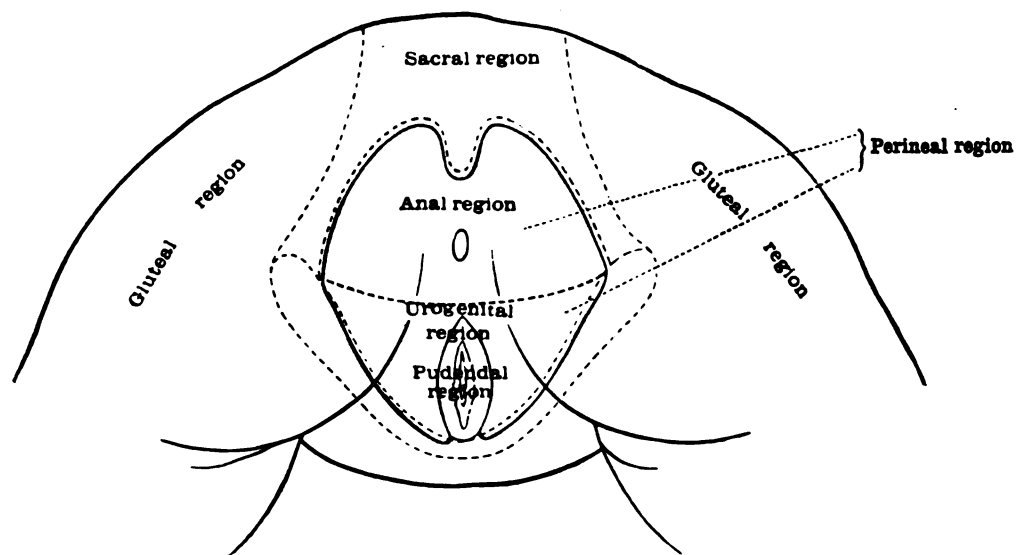


FIG. 5.—FEMALE PERINEAL REGION.

Perineal Region.

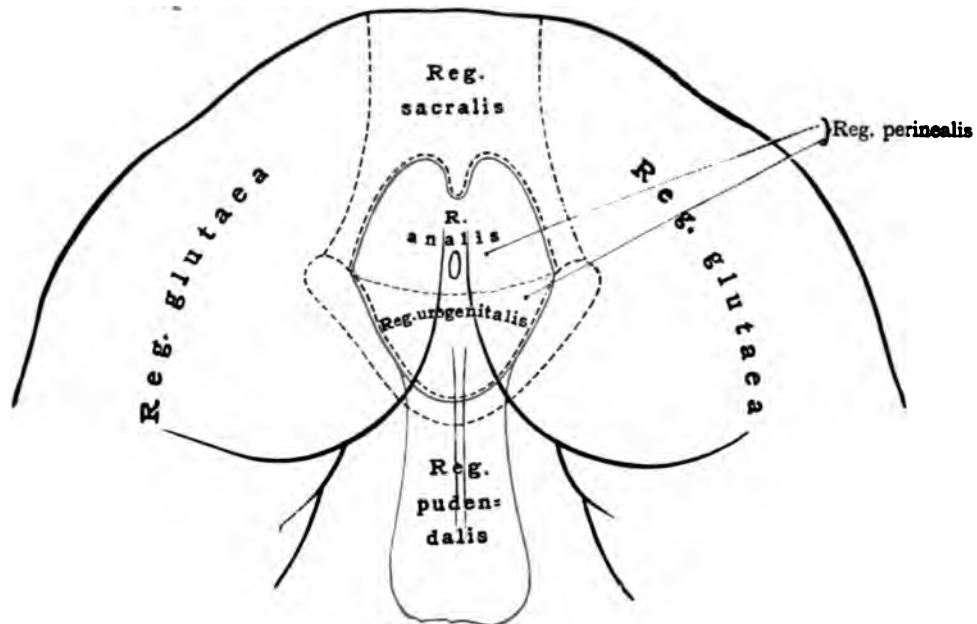


FIG. 4a.—MALE PERINEAL REGION.

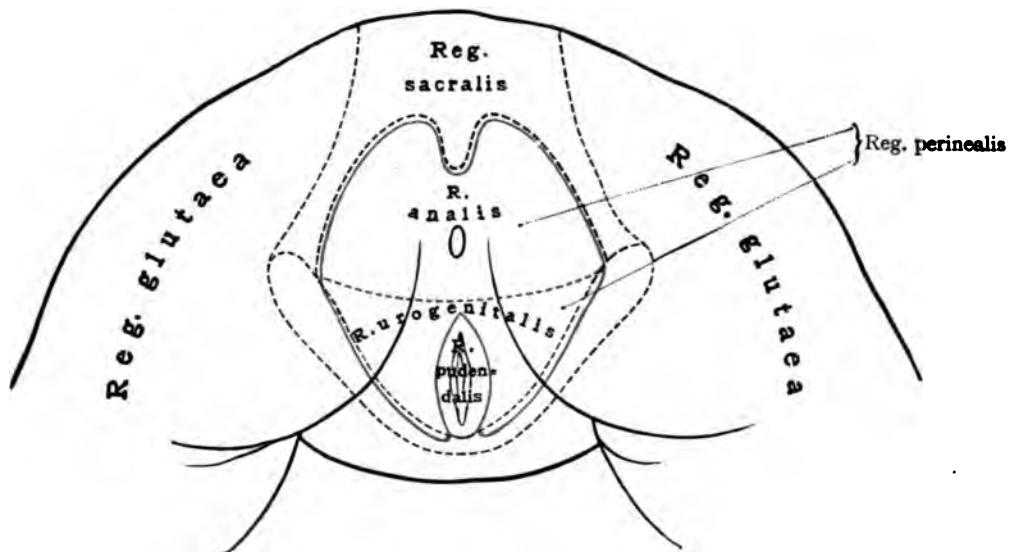


FIG. 5a.—FEMALE PERINEAL REGION.

Regio Perinealis.

OSTEOLOGIA

OSTEOLOGY

THE STRUCTURE OF THE BONES

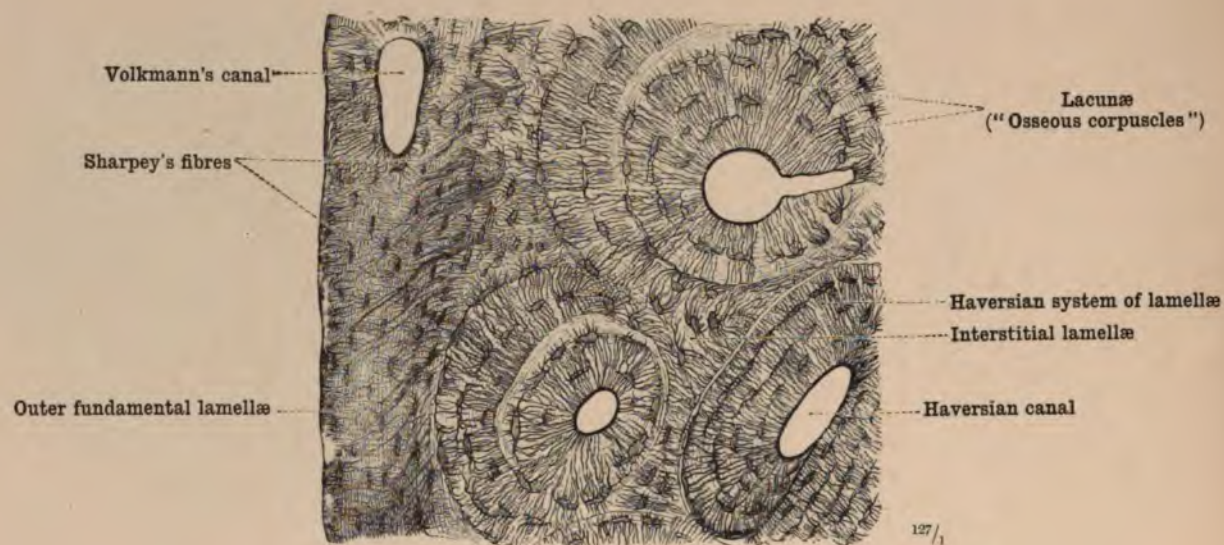


FIG. 6.—PORTION OF A CROSS-SECTION THROUGH A LONG BONE.

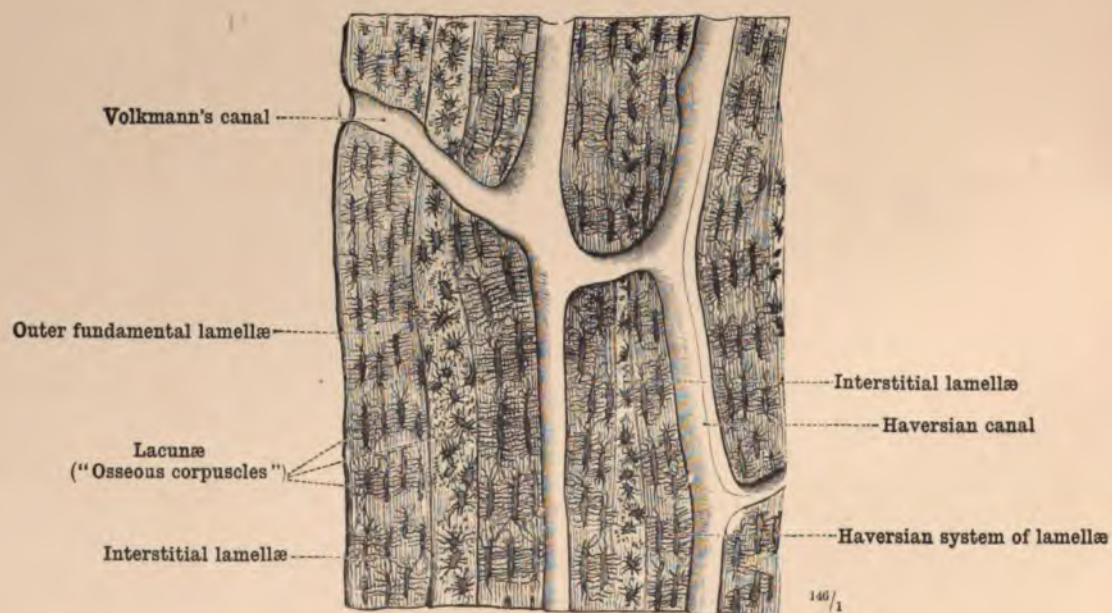


FIG. 7.—PORTION OF A LONGITUDINAL SECTION THROUGH A LONG BONE.

Microscopical Structure of Bone.

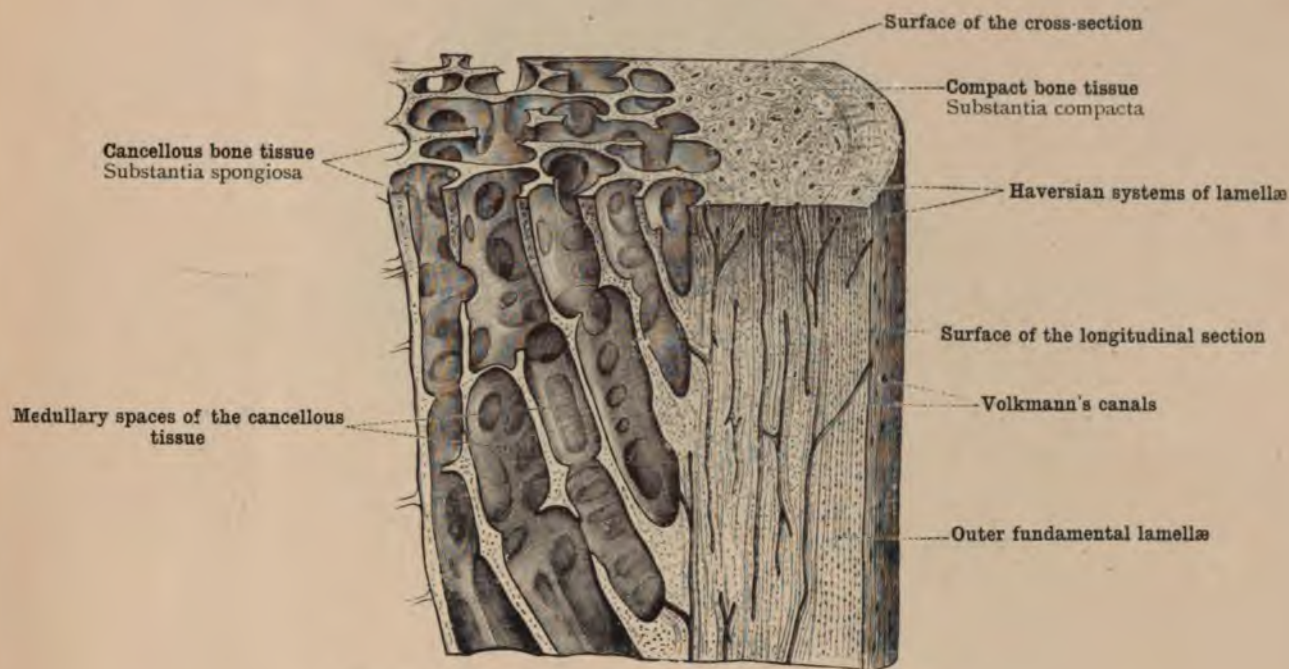


FIG. 8.—DIAGRAM OF THE STRUCTURE OF BONE.

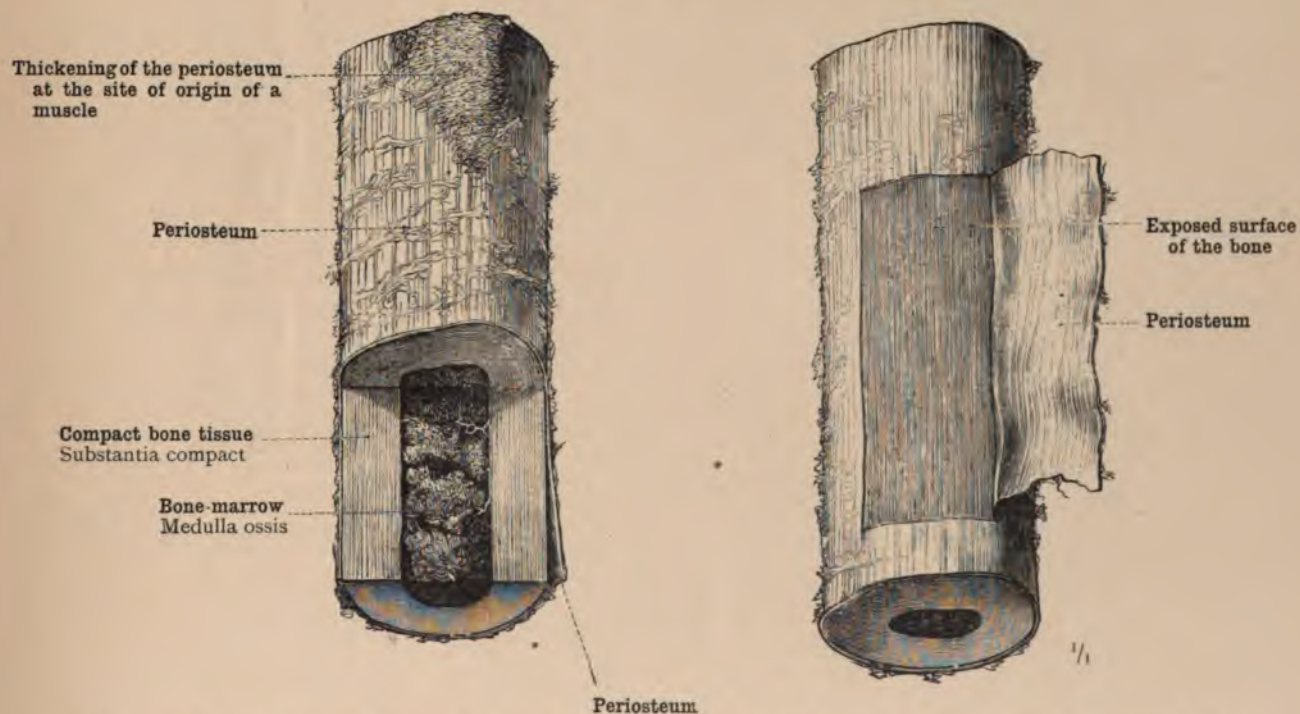


FIG. 9.—PART OF THE MIDDLE SEGMENT OF THE FEMUR FROM WHICH THE PERIOSTEUM HAS BEEN PARTIALLY REMOVED.

The medullary canal (cavum medullare) has been opened, and the bone-marrow (medulla ossis) is seen.

Periosteum and Bone-Marrow (Medulla Ossium).



FIG. 10.—PROXIMAL PORTION IN
FRONTAL SECTION.



FIG. 11.—DISTAL PORTION IN
SAGITTAL SECTION.

Humerus—Arm-bone: Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa longa—Long bones.

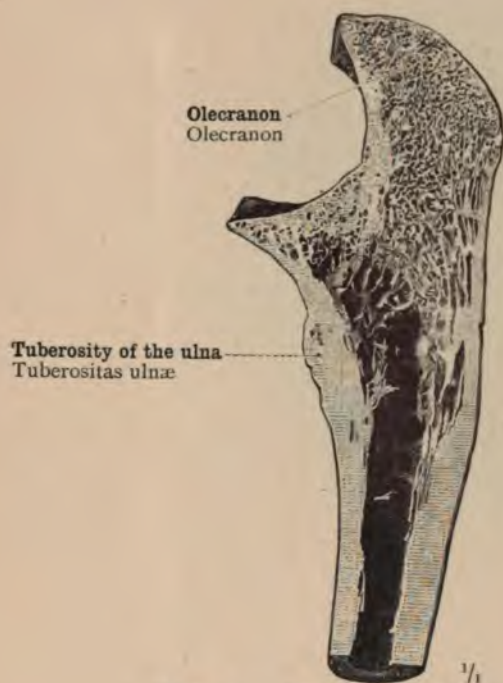


FIG. 12.—PROXIMAL PORTION IN
SAGITTAL SECTION.
Ulna.



FIG. 13.—DISTAL PORTION IN
FRONTAL SECTION.

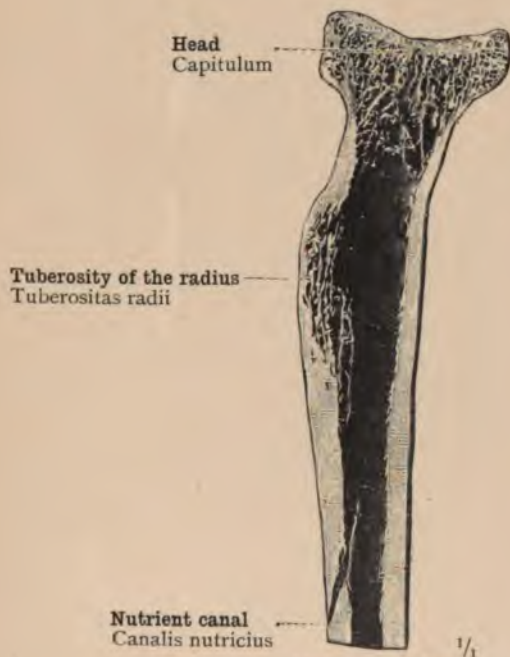


FIG. 14.—PROXIMAL PORTION.
Radius.



FIG. 15.—DISTAL PORTION.

Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa longa—Long bones.

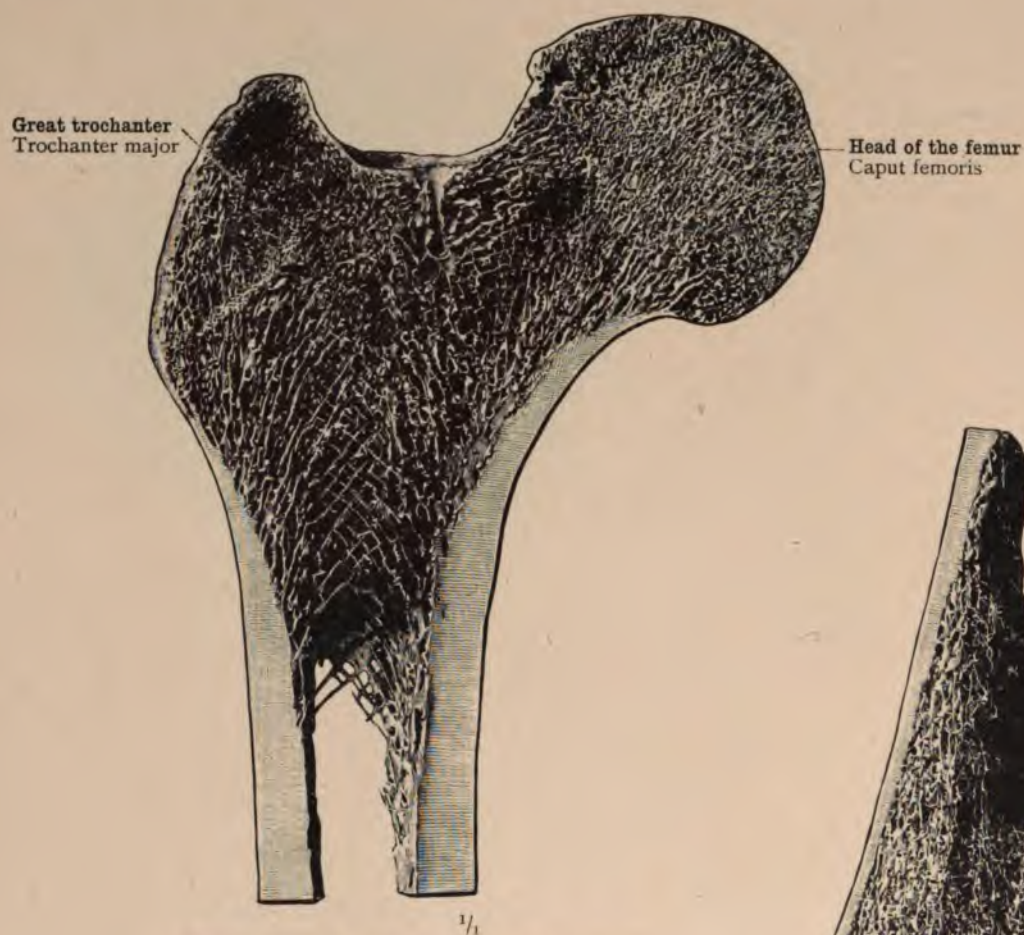


FIG. 16.—PROXIMAL PORTION IN
FRONTAL SECTION.

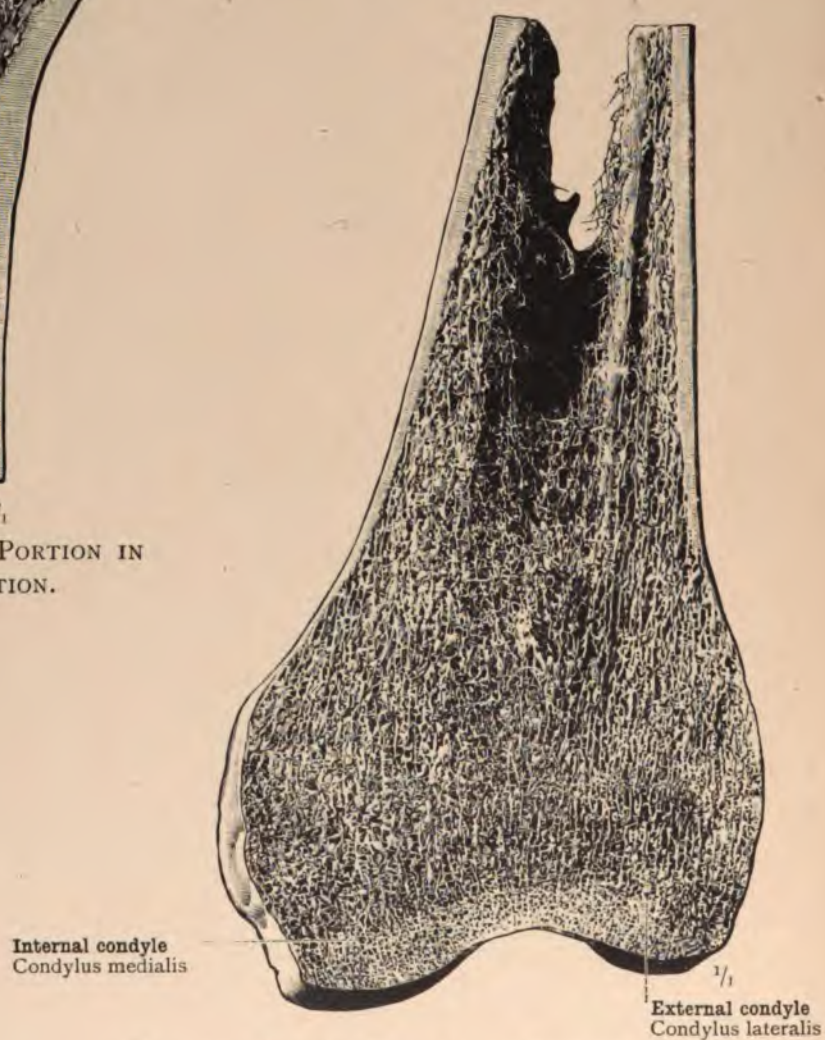


FIG. 17.—DISTAL PORTION IN FRONTAL SECTION.

Femur—Thigh-bone: Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa longa—Long bones.



FIG. 18.—PROXIMAL PORTION IN
FRONTAL SECTION.

FIG. 19.—DISTAL PORTION IN
FRONTAL SECTION.

Tibia—Shin-bone: Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa longa—Long bones.

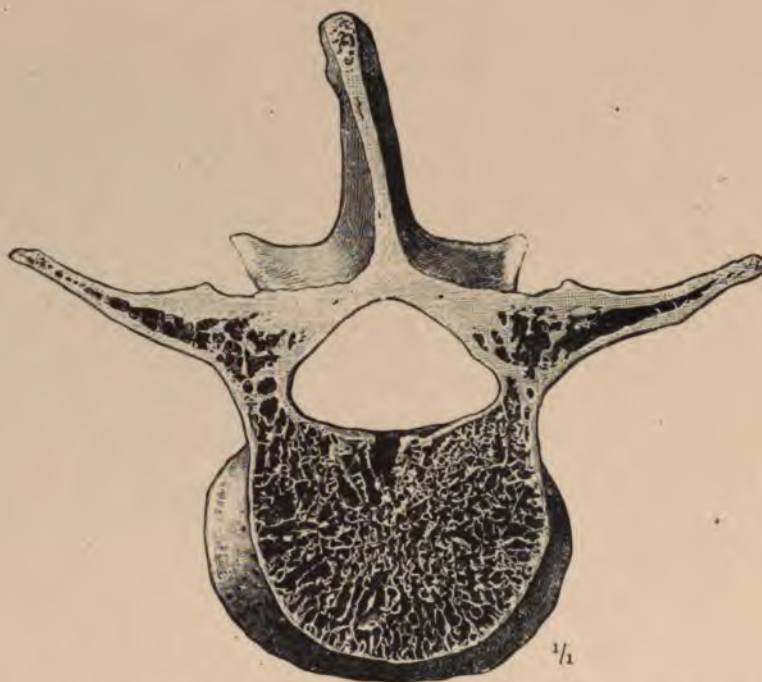


FIG. 20.—THIRD LUMBAR VERTEBRA IN HORIZONTAL SECTION.

FIG. 21.—SIXTH DORSAL
VERTEBRA IN SAGITTAL
SECTION.

FIG. 22.—BODY OF THE SECOND LUMBAR VERTEBRA IN FRONTAL SECTION.

Vertebræ: Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa brevia—Short bones.



FIG. 23.—OS CUNEIFORME III., THE EXTERNAL CUNEIFORM BONE.



FIG. 24.—TALUS, THE ASTRAGALUS, IN SAGITTAL SECTION.



FIG. 25.—CALCANEUM, THE OS CALCIS, IN SAGITTAL SECTION.

Ossa tarsi—Tarsal bones: Substantia compacta et substantia spongiosa ossium—Compact and cancellous tissue of the bones.

Ossa brevia—Short bones.

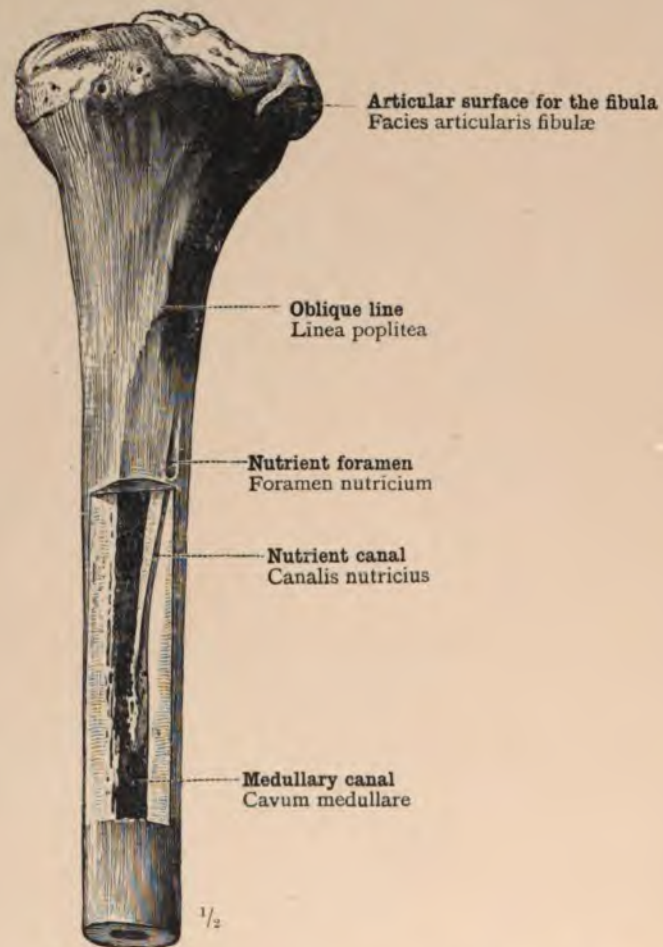


FIG. 26.—NUTRIENT FORAMEN AND NUTRIENT CANAL OF THE RIGHT TIBIA.
SEEN FROM BEHIND.

By sawing away a portion of the shaft the whole length of the nutrient canal has been opened up.

Nutrient Foramen and Nutrient Canal of a Long Bone.

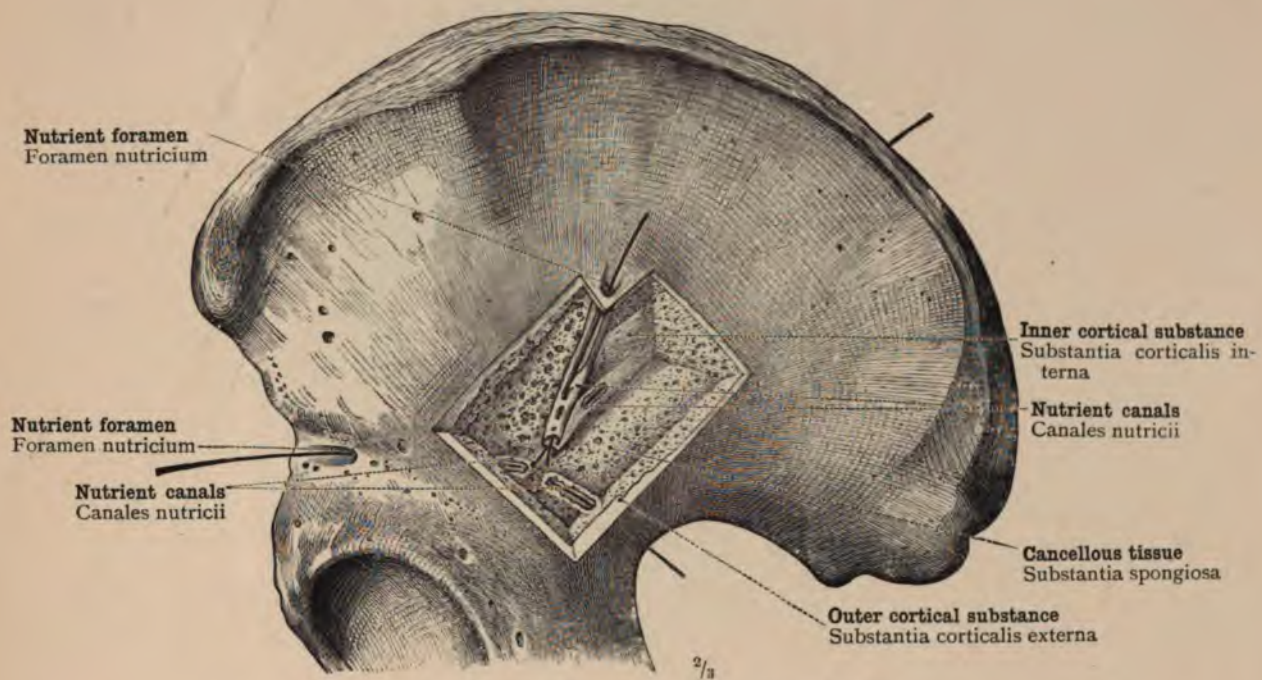


FIG. 27.—OUTER SURFACE OF LEFT ILIUM.

By the removal of the outer compact layer and the cancellous tissue of a portion of the bone, the nutrient canals have been displayed. The bristles projecting towards the right above and below show that the nutrient canals into which they have been inserted open on the inner surface of the bone—that turned away from the observer.

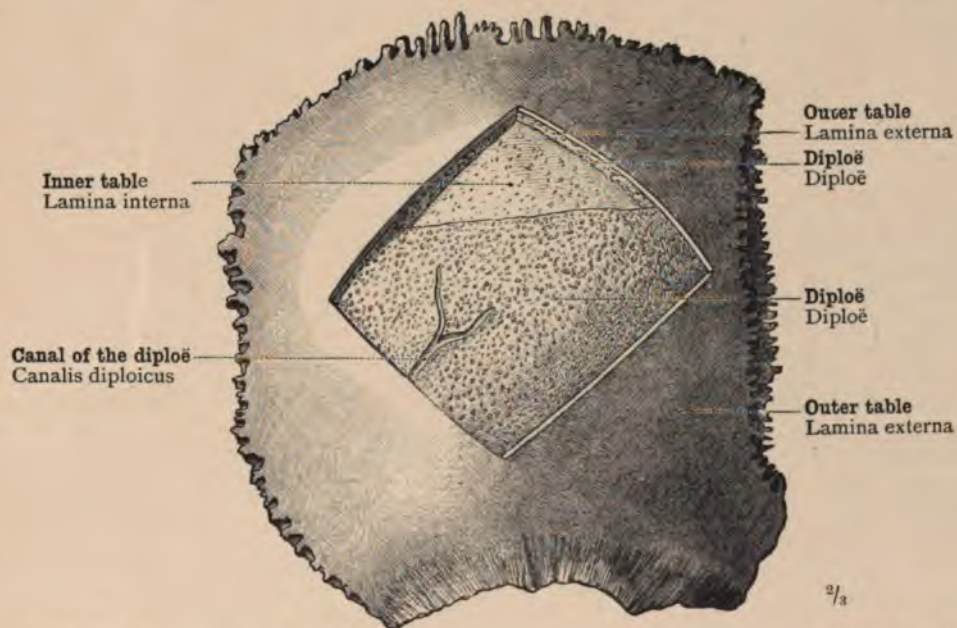
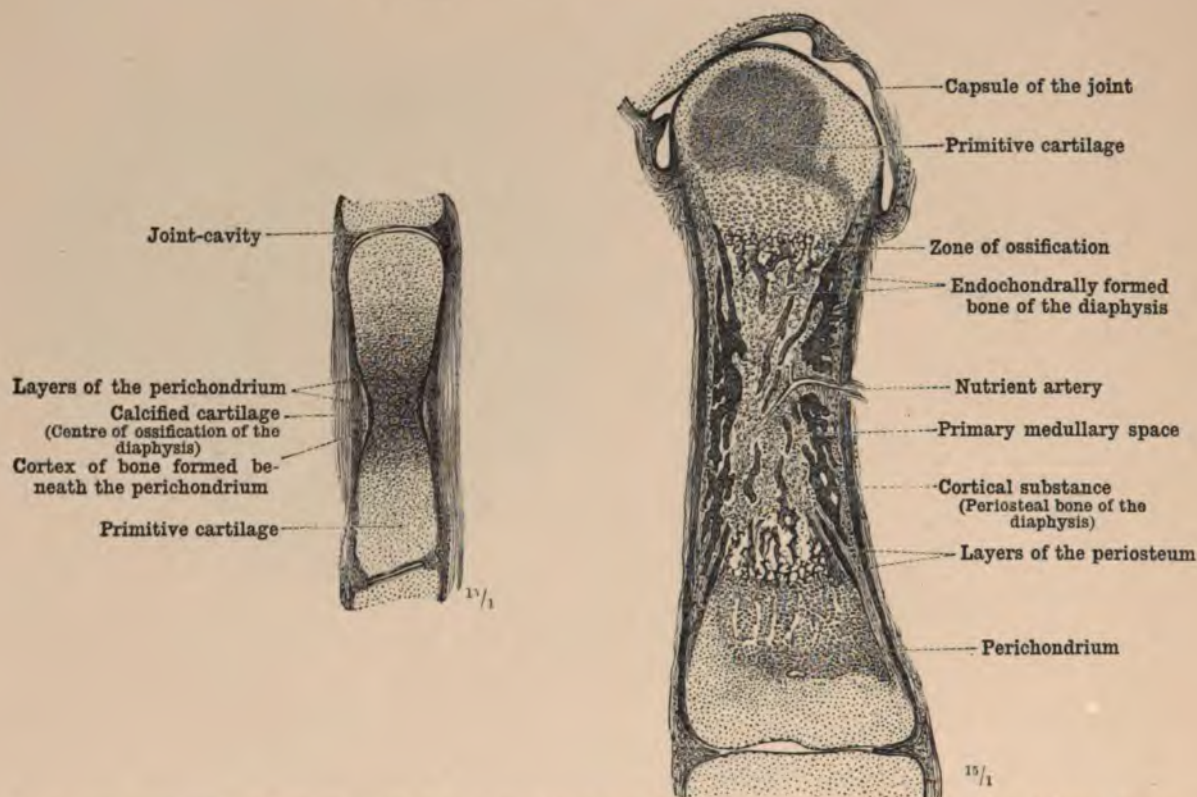


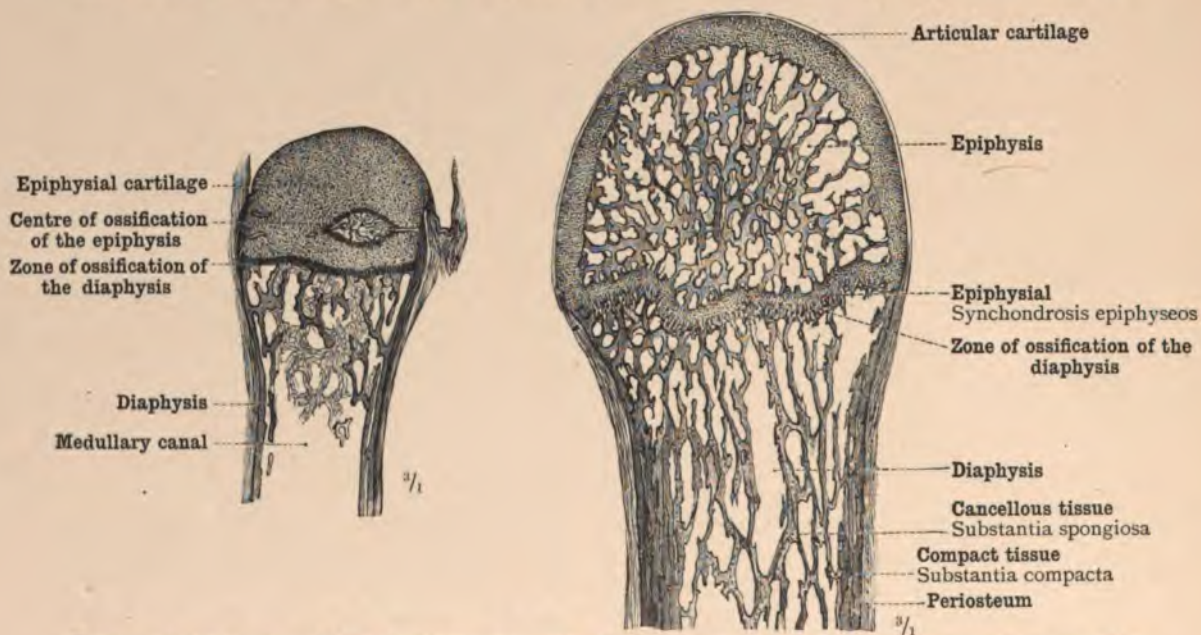
FIG. 28.—OS PARIETALE, PARIETAL BONE, PREPARED TO SHOW THE DIPLOË AND THE COMPACT INNER TABLE. SEEN FROM WITHOUT.

Substantia compacta, substantia spongiosa, et canales nutricii—Compact tissue, cancellous tissue, and nutrient canals.

Ossa plana—Flat bones.



FIGS. 29 AND 30.—TWO STAGES IN THE INTRACARTILAGINOUS OSSIFICATION OF LONG BONES, AS SHOWN BY LONGITUDINAL SECTIONS OF THE PHALANGES OF A HUMAN FŒTUS.



FIGS. 31 AND 32.—TWO STAGES IN THE INTRACARTILAGINOUS OSSIFICATION OF THE EPIPHYSIS OF A LONG BONE, AS SHOWN BY LONGITUDINAL SECTIONS OF THE DISTAL PORTIONS OF METACARPAL BONES.

Development of the Bones.



FIG. 33.—INTRACARTILAGINOUS OSSIFICATION OF A SHORT BONE.
A section of the cuboid bone of a new-born child.

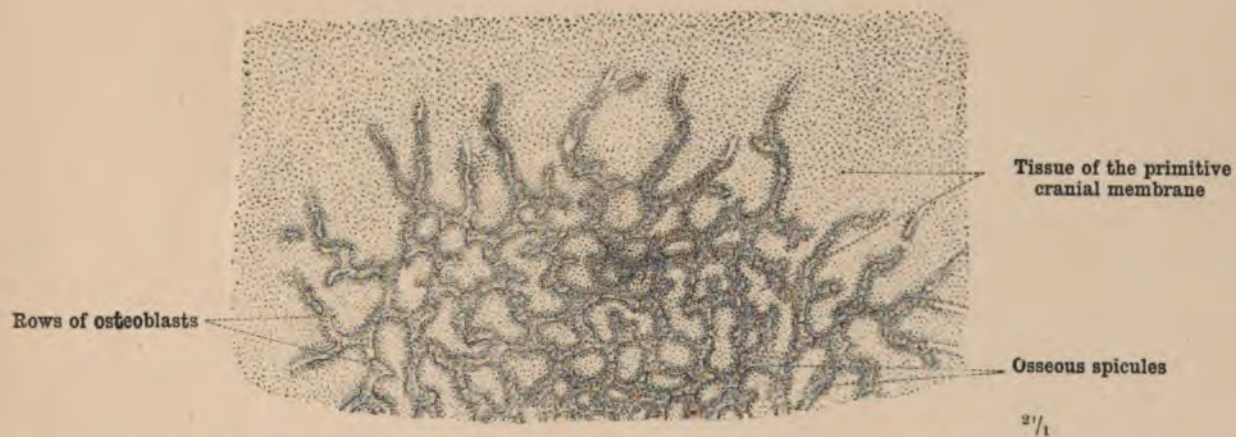


FIG. 34.—INTRAMEMBRANOUS OSSIFICATION OF THE BONES OF THE CRANIAL VAULT.
Upper half of the parietal bone of a human foetus in the eleventh week of intra-uterine life.

THE STRUCTURE OF THE BONES

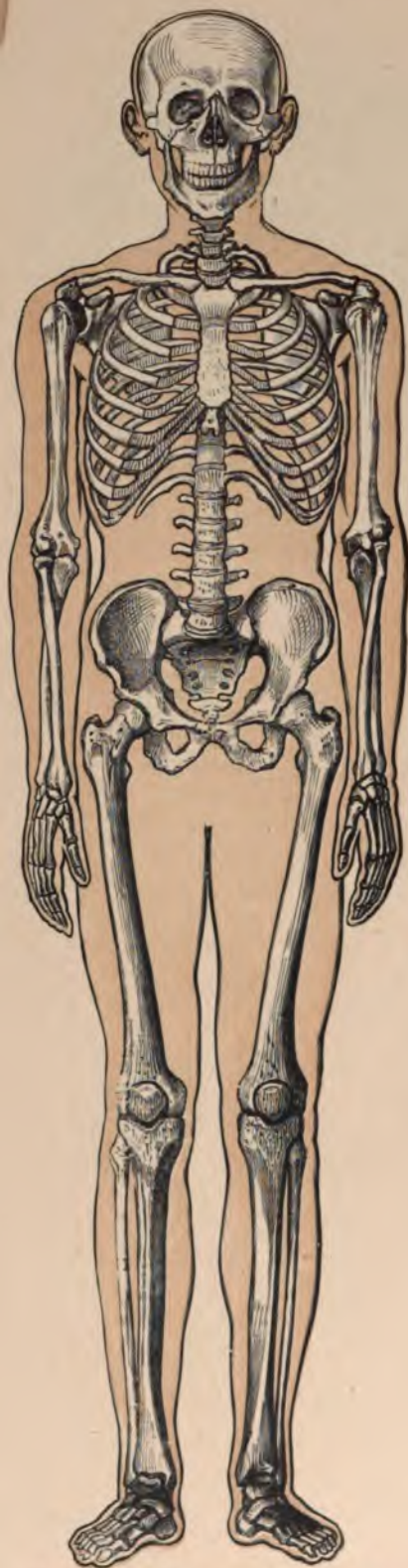


FIG. 35.—ANTERIOR ASPECT.



FIG. 36.—VIEWED FROM THE LEFT SIDE,
THE ARM HAVING BEEN REMOVED.

Skeleton humanum—The human skeleton.

SKELETON TRUNCI
THE AXIAL SKELETON

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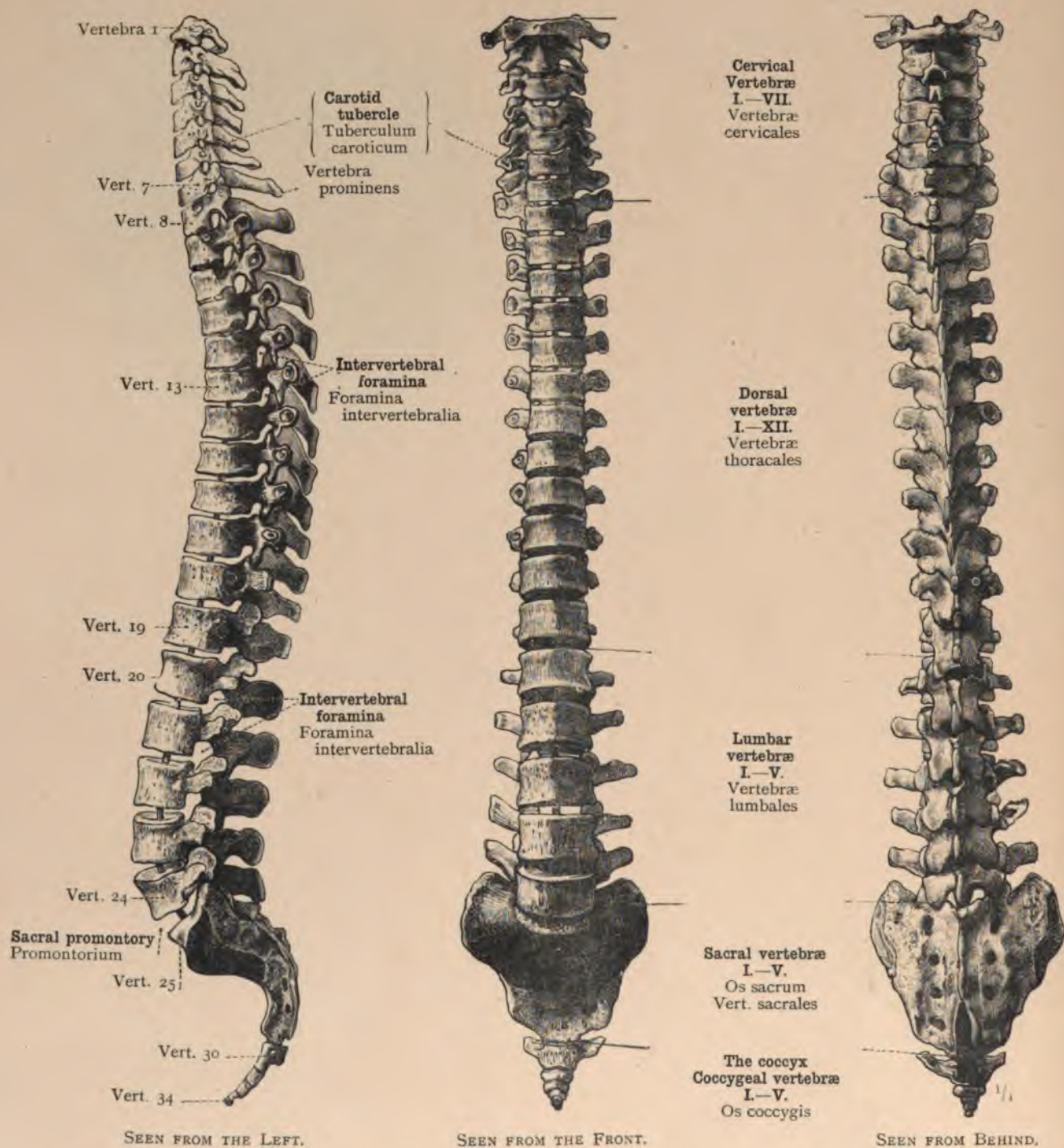
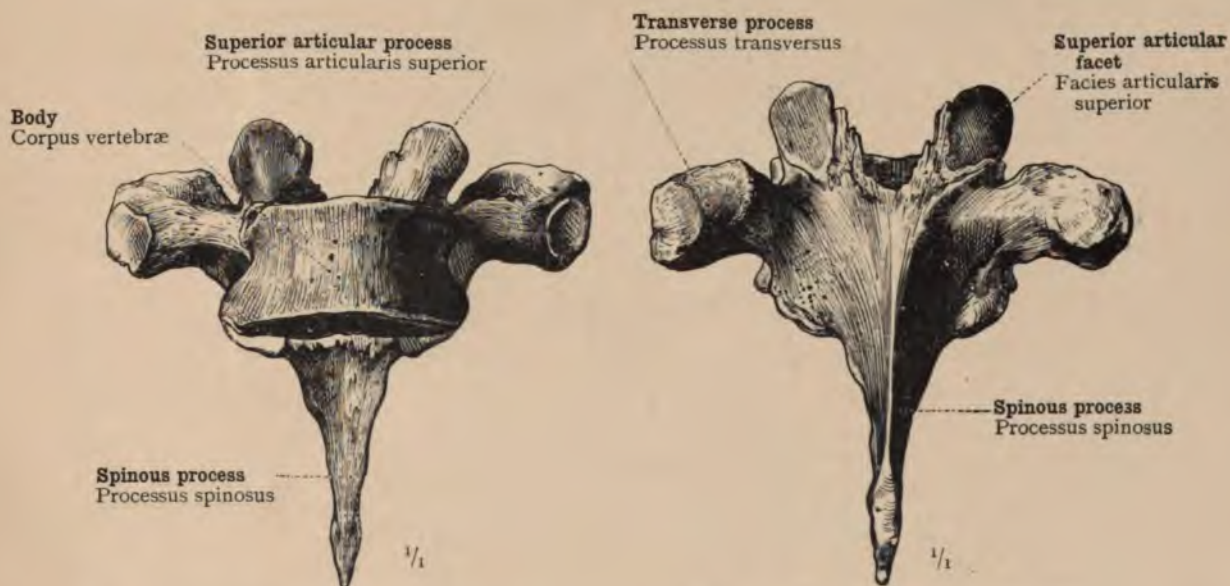
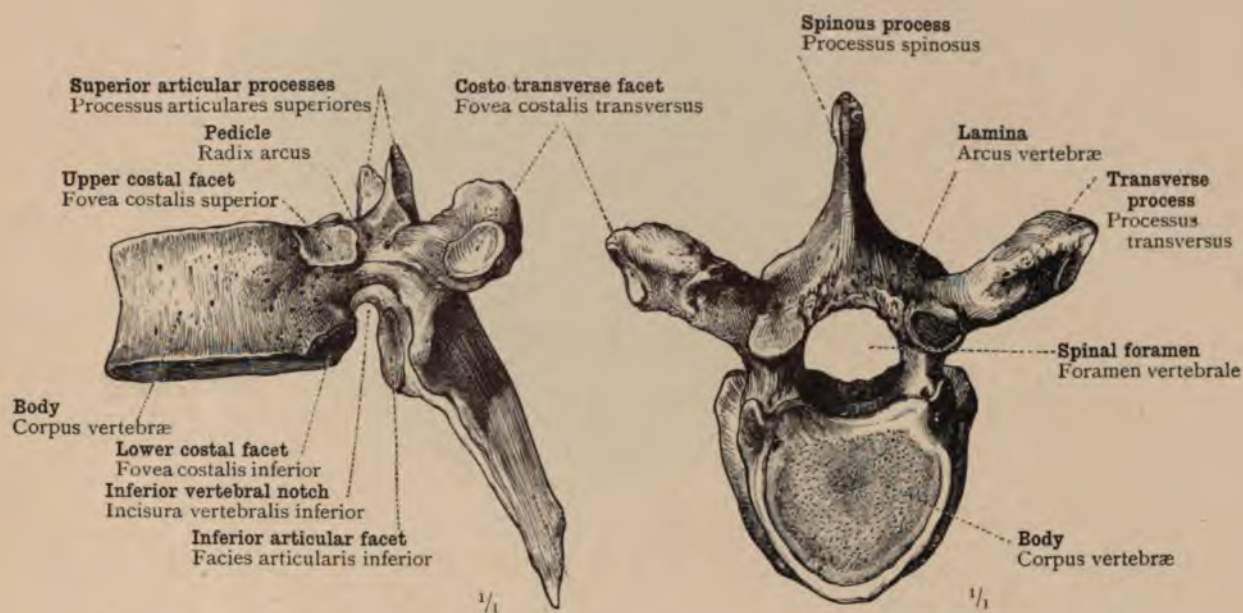


FIG. 37.—THE VERTEBRAL COLUMN AS A WHOLE. DIVISION AND NOMENCLATURE OF THE VERTEBRÆ.

Columna vertebralis—The spinal column.



Vertebræ: Vertebra thoracalis VI.—Sixth dorsal vertebra.

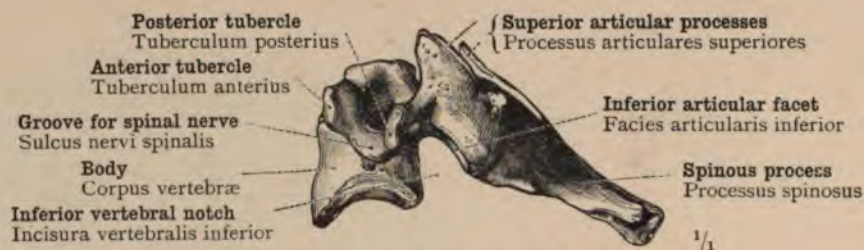


FIG. 42.—SEEN FROM THE LEFT SIDE.



FIG. 43.—SEEN FROM BEFORE.

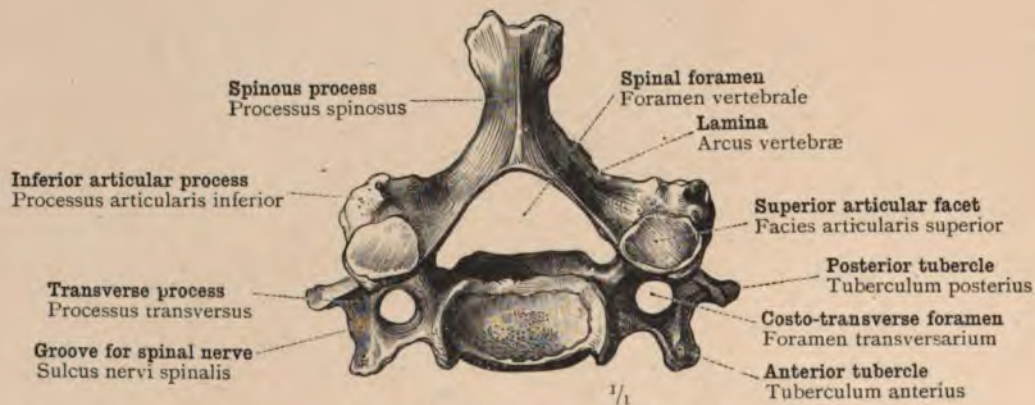


FIG. 44.—SEEN FROM ABOVE.

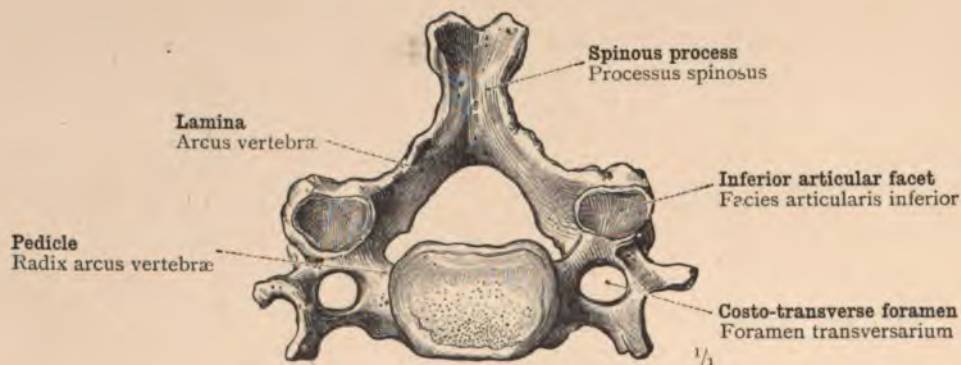


FIG. 45.—SEEN FROM BELOW.

Vertebræ : Vertebra cervicalis V.—Fifth cervical vertebra.

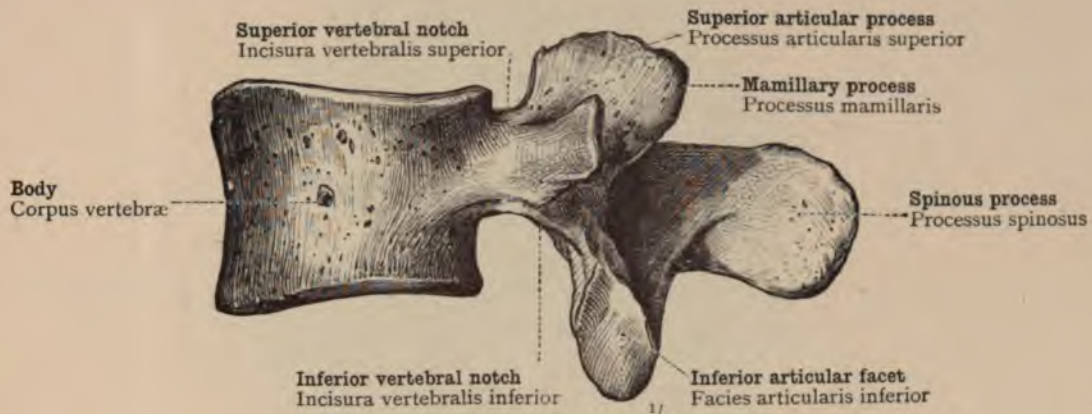


FIG. 46.—SEEN FROM THE LEFT SIDE.

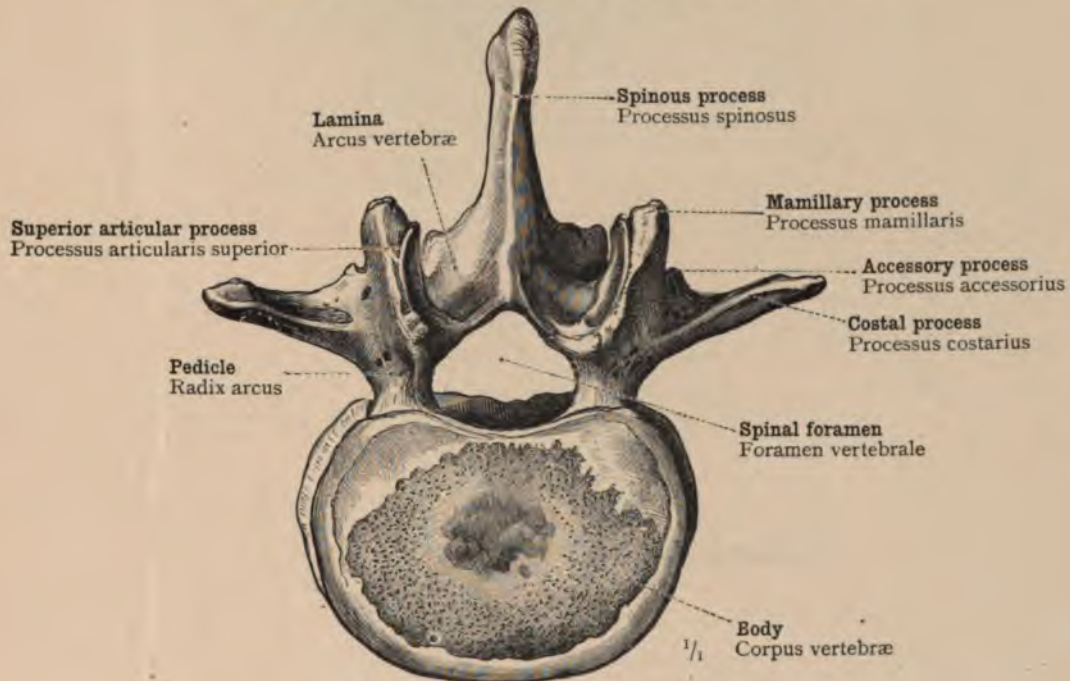


FIG. 47.—SEEN FROM ABOVE.



FIG. 48.—SEEN FROM BEHIND.

Vertebræ: Vertebra lumbalis II.—Second lumbar vertebra.



FIG. 49.—VERTEBRA THORACALIS I.—FIRST DORSAL VERTEBRA. SEEN FROM BEFORE.



FIG. 50.—VERTEBRA THORACALIS XI.—ELEVENTH DORSAL VERTEBRA. SEEN FROM THE LEFT SIDE.

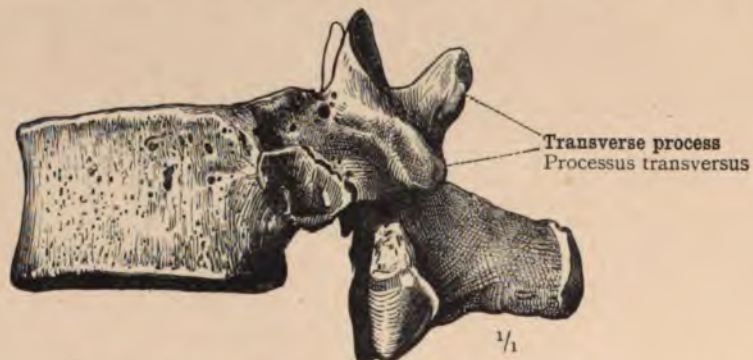


FIG. 51.—VERTEBRA THORACALIS XII.—TWELFTH DORSAL VERTEBRA. SEEN FROM THE LEFT SIDE.



FIG. 52.—VERTEBRA LUMBALIS V.—FIFTH LUMBAR VERTEBRA. SEEN FROM THE LEFT SIDE.

Vertebræ: Transitional forms of the dorsal and lumbar vertebræ.

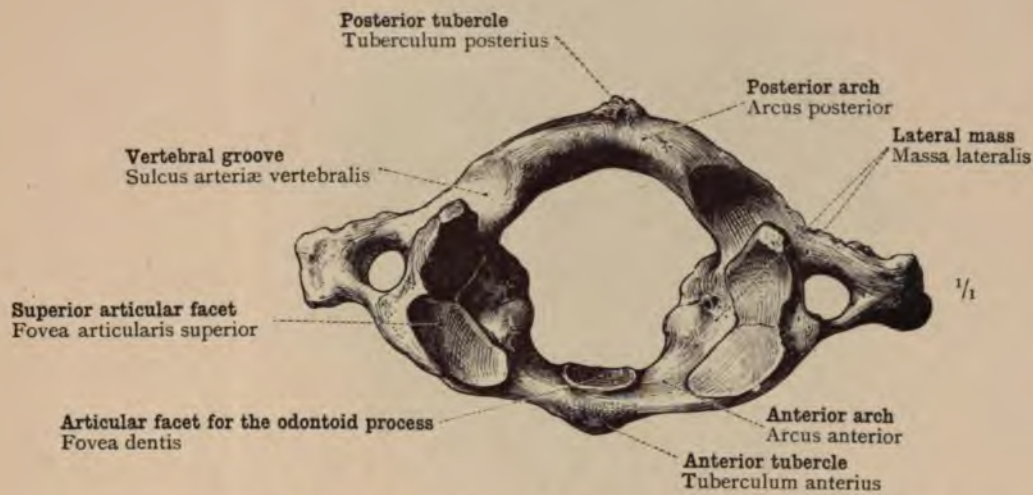


FIG. 53.—THE ATLAS, OR FIRST CERVICAL VERTEBRA. SEEN FROM ABOVE.

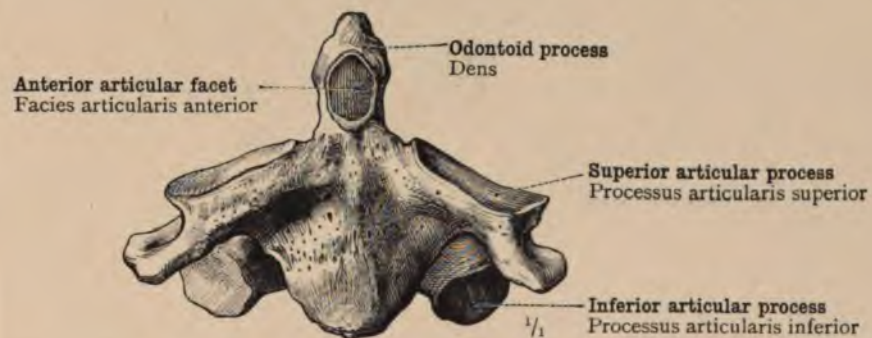


FIG. 54.—EPISTROPHEUS, THE AXIS, OR SECOND CERVICAL VERTEBRA. SEEN FROM BEFORE.

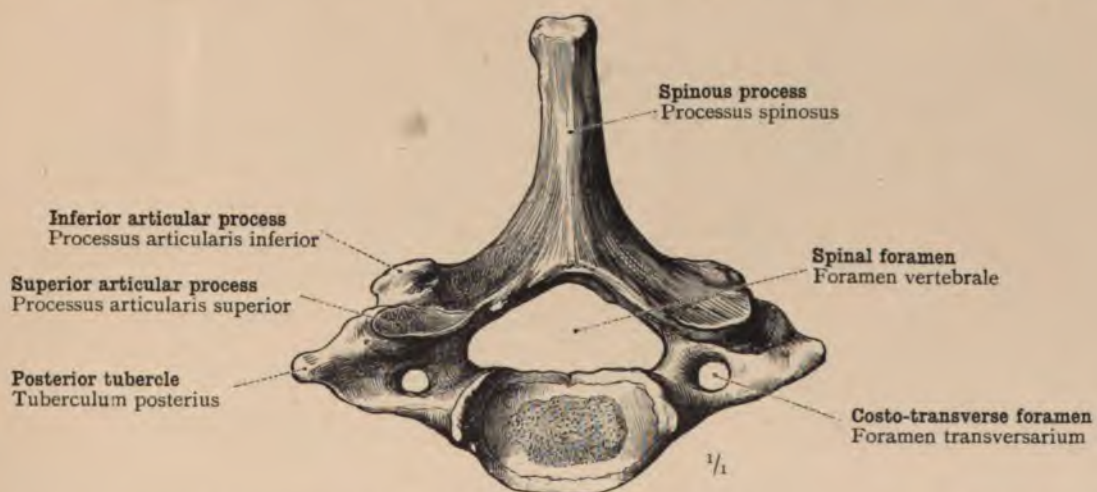


FIG. 55.—VERTEBRA CERVICALIS VII.—SEVENTH CERVICAL VERTEBRA. SEEN FROM ABOVE.

Vertebræ: The atypical cervical vertebræ.

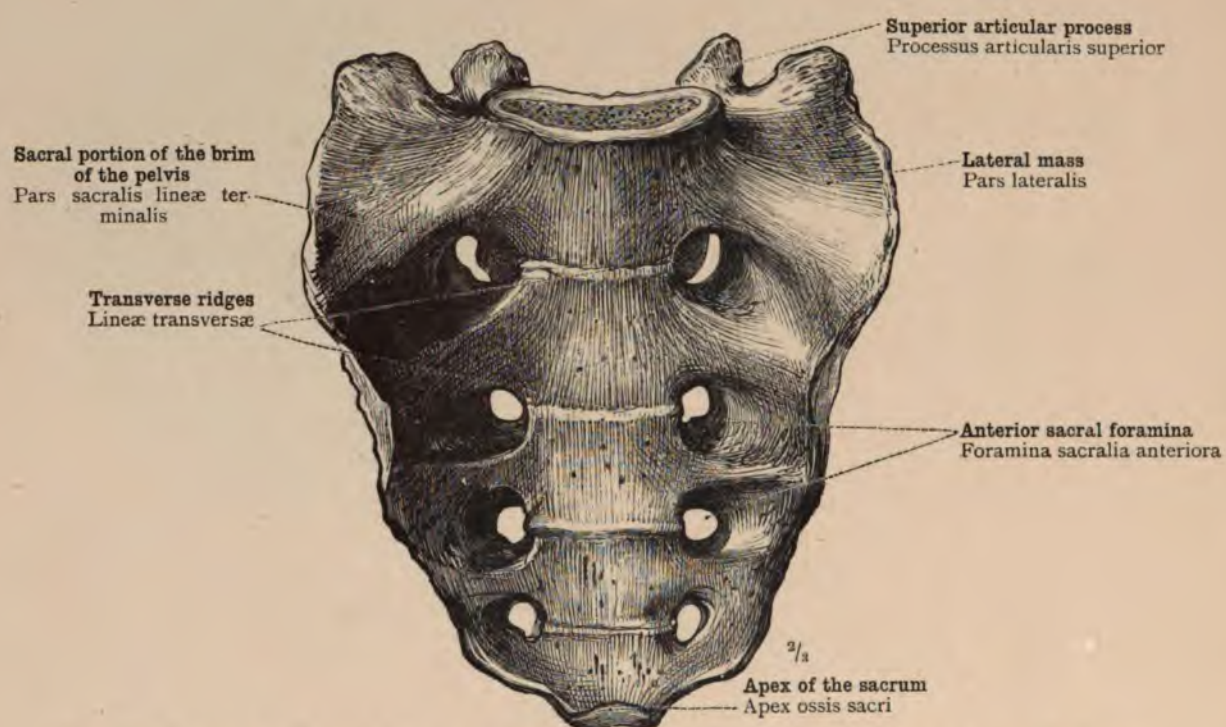


FIG. 56.—MALE SACRUM (FACIES PELVINA—PELVIC SURFACE). SEEN FROM BEFORE.

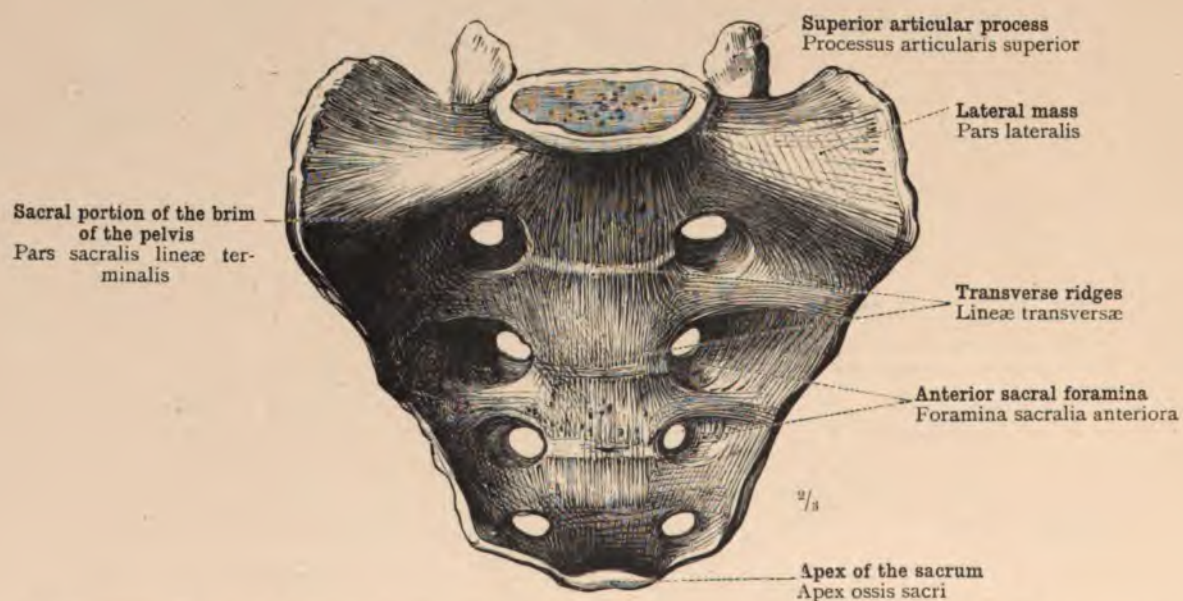


FIG. 57.—FEMALE SACRUM (FACIES PELVINA—PELVIC SURFACE). SEEN FROM BEFORE.

Os sacrum—The sacrum.

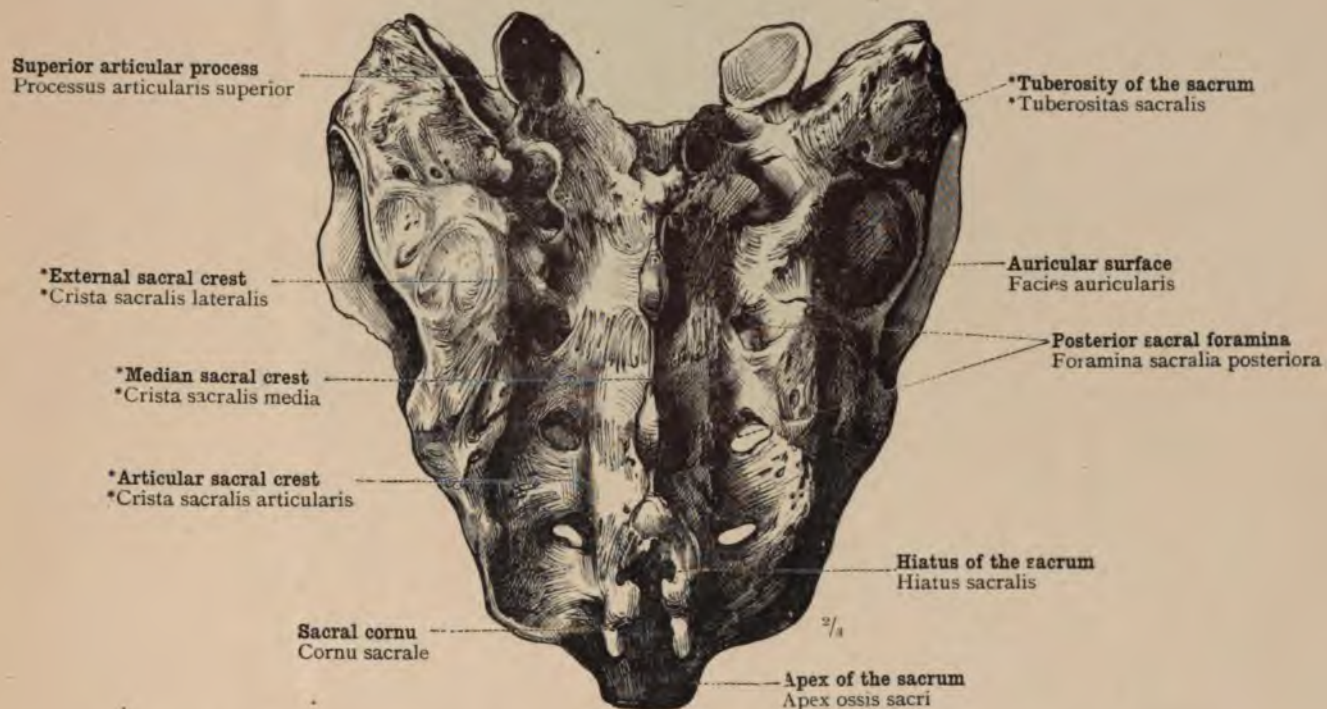


FIG. 58.—MALE SACRUM (FACIES DORSALIS—DORSAL SURFACE). SEEN FROM BEHIND.

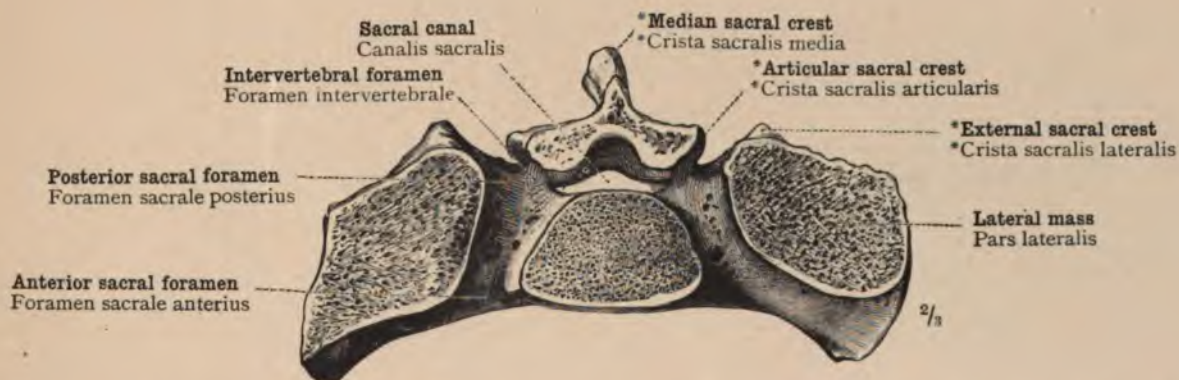


FIG. 59.—TRANSVERSE SECTION THROUGH THE SACRUM AT THE LEVEL OF THE FIRST SET OF SACRAL FORAMINA.

Os sacrum—The sacrum.

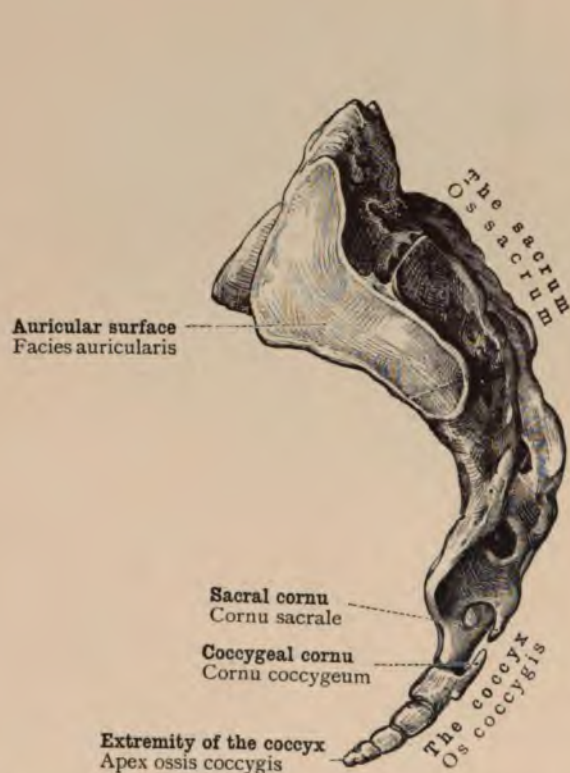


FIG. 60.—SACRUM AND COCCYX. SEEN FROM THE LEFT SIDE.

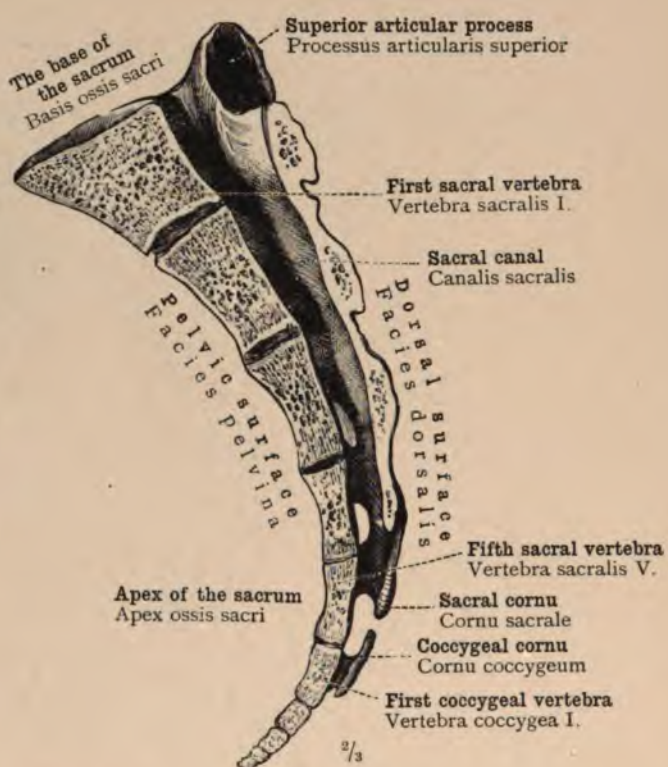


FIG. 61.—SACRUM AND COCCYX IN SAGITTAL SECTION THROUGH THE MEDIAN LINE.



FIG. 62.—COCCYX SEEN FROM BEFORE.

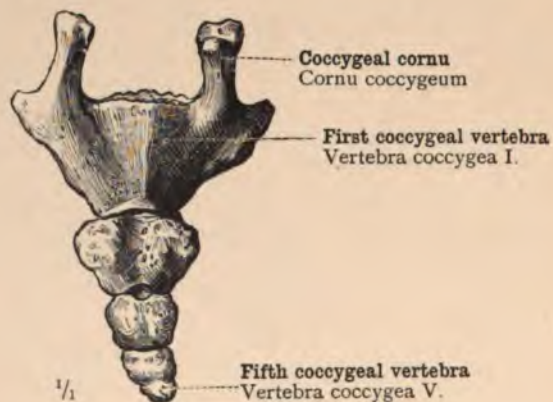


FIG. 63.—COCCYX SEEN FROM BEHIND.

Os sacrum et os coccygis—Sacrum and coccyx.

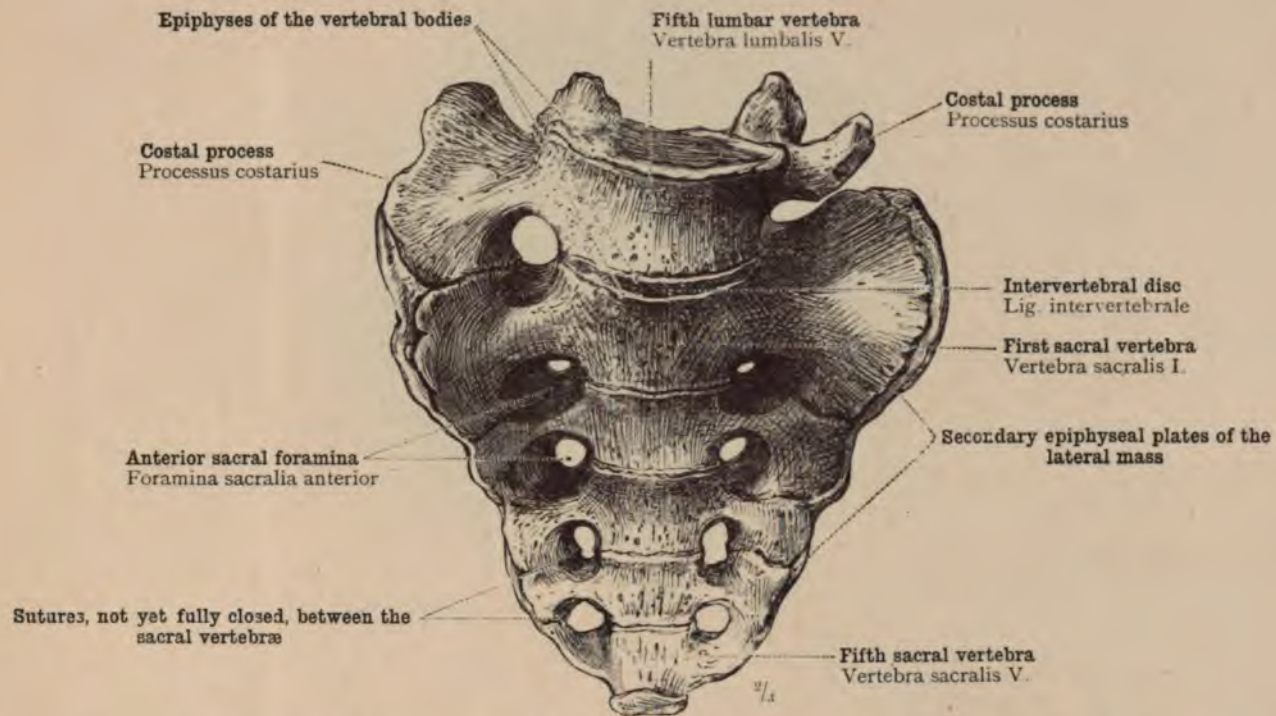


FIG. 64.—UNILATERAL ASSIMILATION AND COMMENCING ANKYLOSIS OF THE FIFTH LUMBAR VERTEBRA WITH THE SACRUM. SEEN FROM BEFORE.

From a boy seventeen years of age. Epiphyses on the bodies of the sacral vertebra, and along the lateral margins of the sacrum.

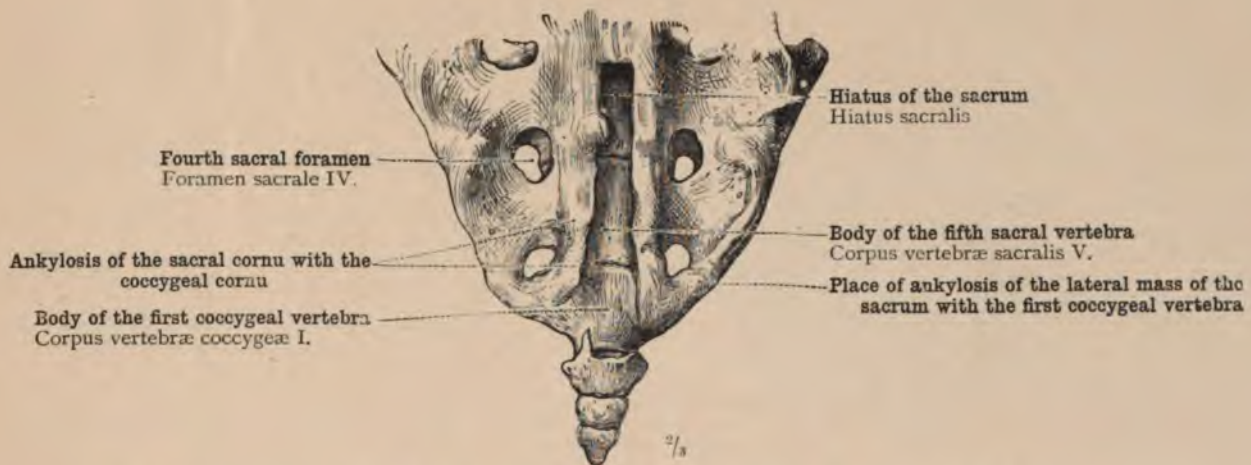


FIG. 65.—ANKYLOSIS OF THE SACRUM WITH THE COCCYX. SEEN FROM BEHIND.

From a man forty years of age.

Anomalous Ankyloses of the Sacrum.

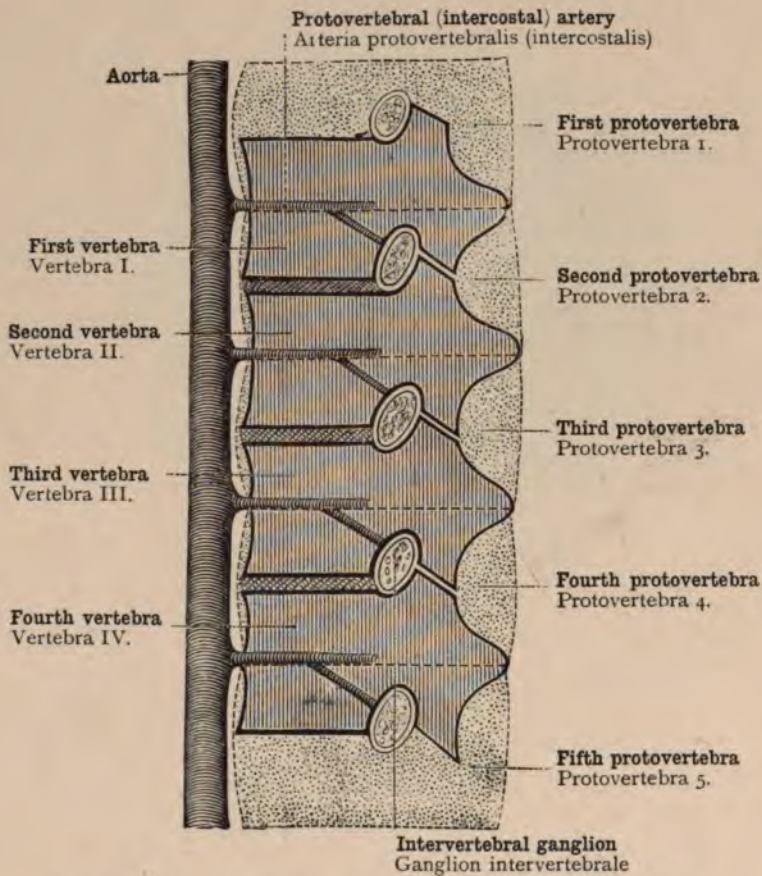


FIG. 66.—DIAGRAM SHOWING THE RELATION OF THE PROTOVERTEBRÆ. (FROM VON EBNER.)

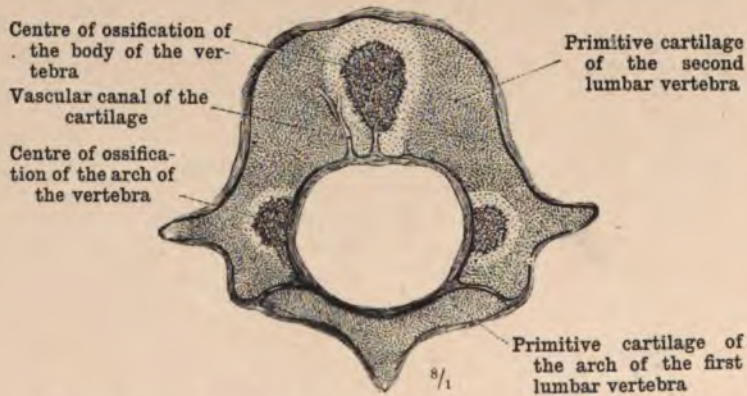


FIG. 69.—THE THREE CENTRES OF OSSIFICATION OF A VERTEBRA.

Horizontal section through the second and a portion of the first lumbar vertebrae of a human fetus in the beginning of the fifth month (months of four weeks each). (Length of fetus, $5\frac{1}{2}$ inches.)

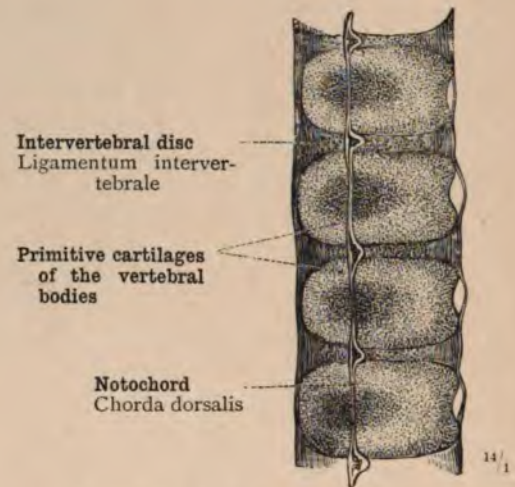


FIG. 67.—PRIMITIVE CARTILAGES OF THE VERTEBRAL BODIES.

From a sagittal section through the vertebral column of a human fetus in the tenth week. (Length of fetus, $2\frac{1}{4}$ inches.)

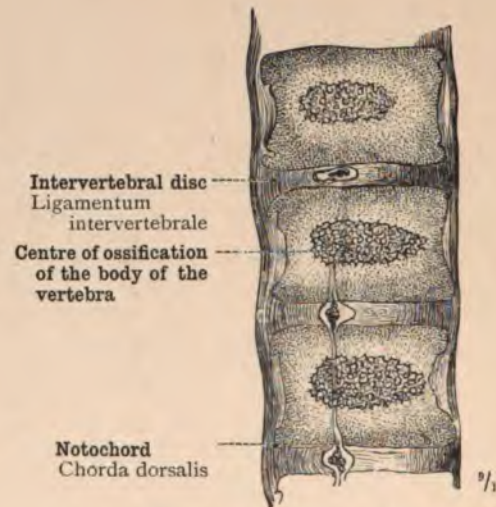


FIG. 68.—CENTRES OF OSSIFICATION OF THE BODIES OF THE VERTEBRÆ.

From a sagittal section through the vertebral column of a human fetus in the fourth month (months of four weeks each). (Length of body, $4\frac{1}{2}$ inches.)

Development of the Vertebrae.



FIG. 70.—FIRST LUMBAR VERTEBRA OF A NEW-BORN CHILD.



FIG. 72.—THE SEVENTH CERVICAL VERTEBRA OF A NEW-BORN CHILD.

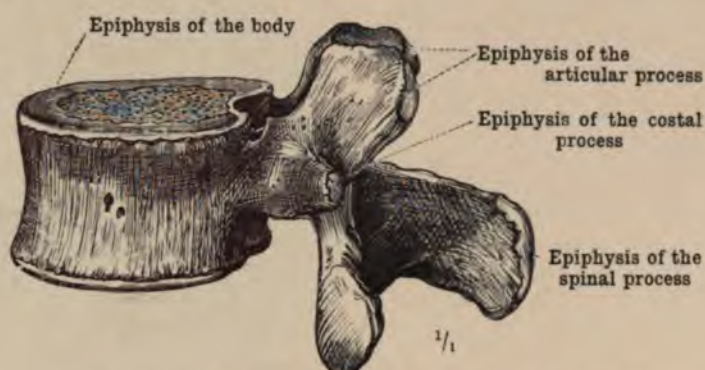


FIG. 71.—FIRST LUMBAR VERTEBRA IN THE EIGHTEENTH YEAR.



FIG. 73.—THE ATLAS AT THE END OF THE FIRST YEAR.

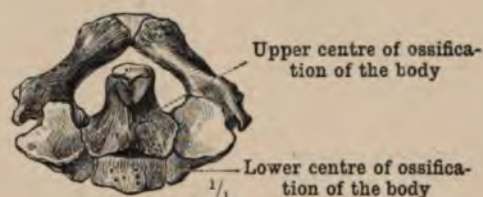


FIG. 74.—THE AXIS AT THE END OF THE FIRST YEAR.



FIG. 75.—THE ATLAS IN THE FOURTH YEAR.



FIG. 76.—THE AXIS IN THE FOURTH YEAR.

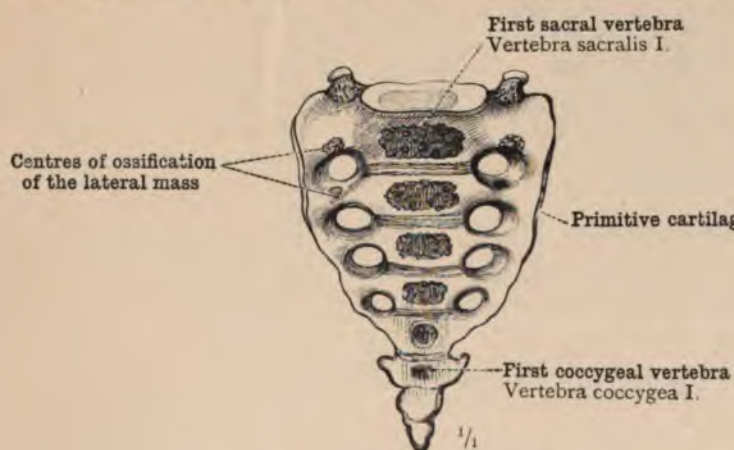


FIG. 77.—SEEN FROM BEFORE.

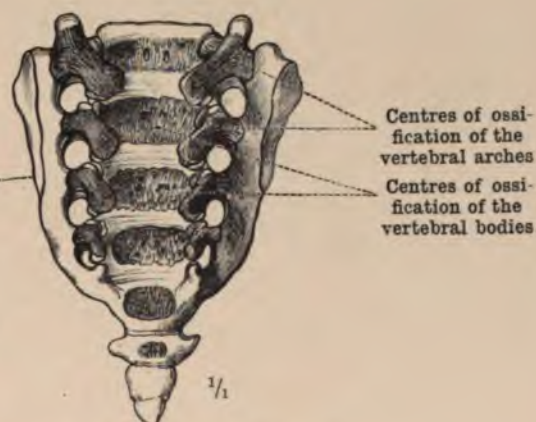


FIG. 78.—SEEN FROM BEHIND.

Development of the Vertebrae: The centres of ossification in the sacrum and coccyx of a child at the age of two months.

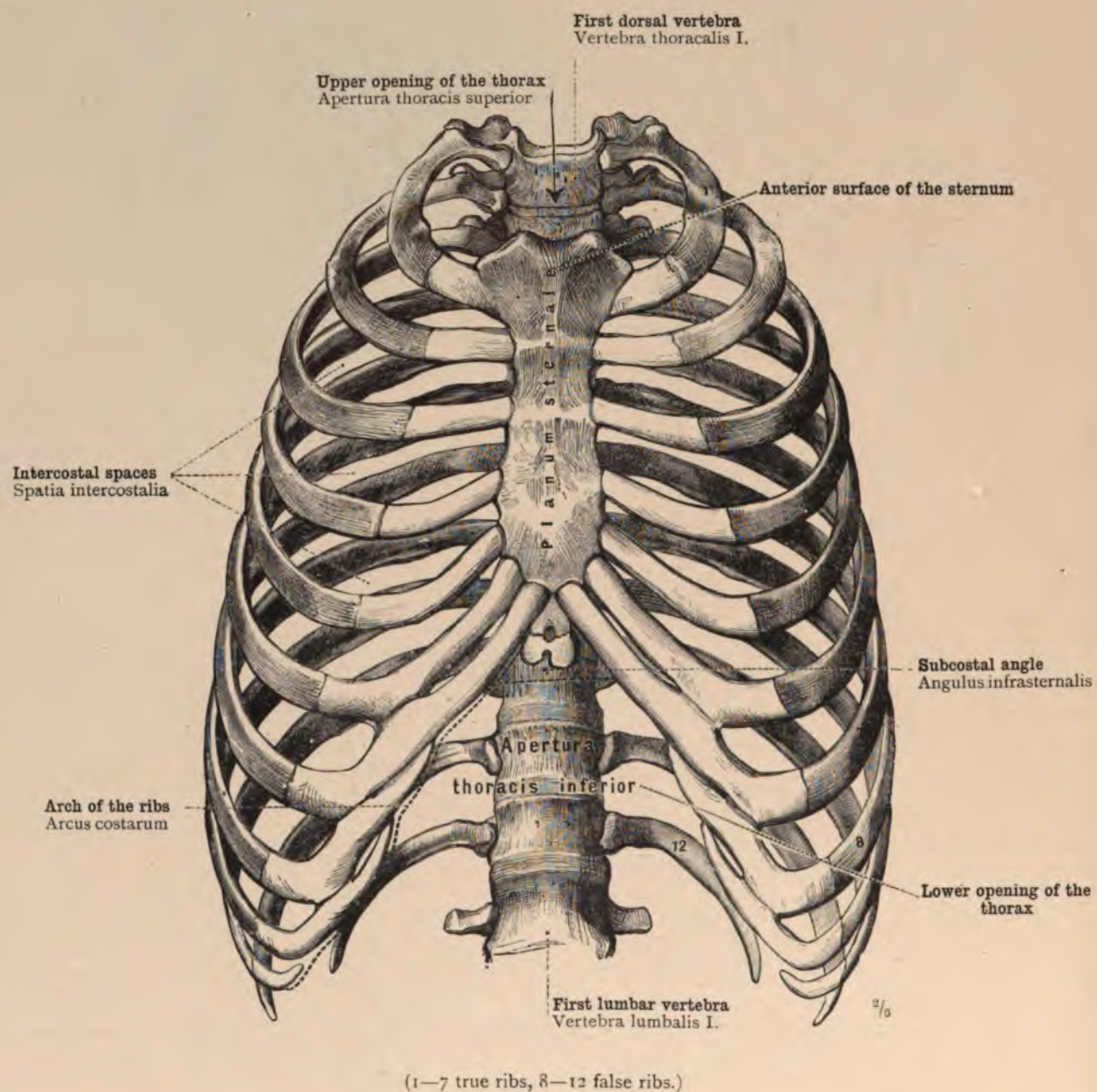


FIG. 79.—THE THORAX SEEN FROM BEFORE.

The Thorax.

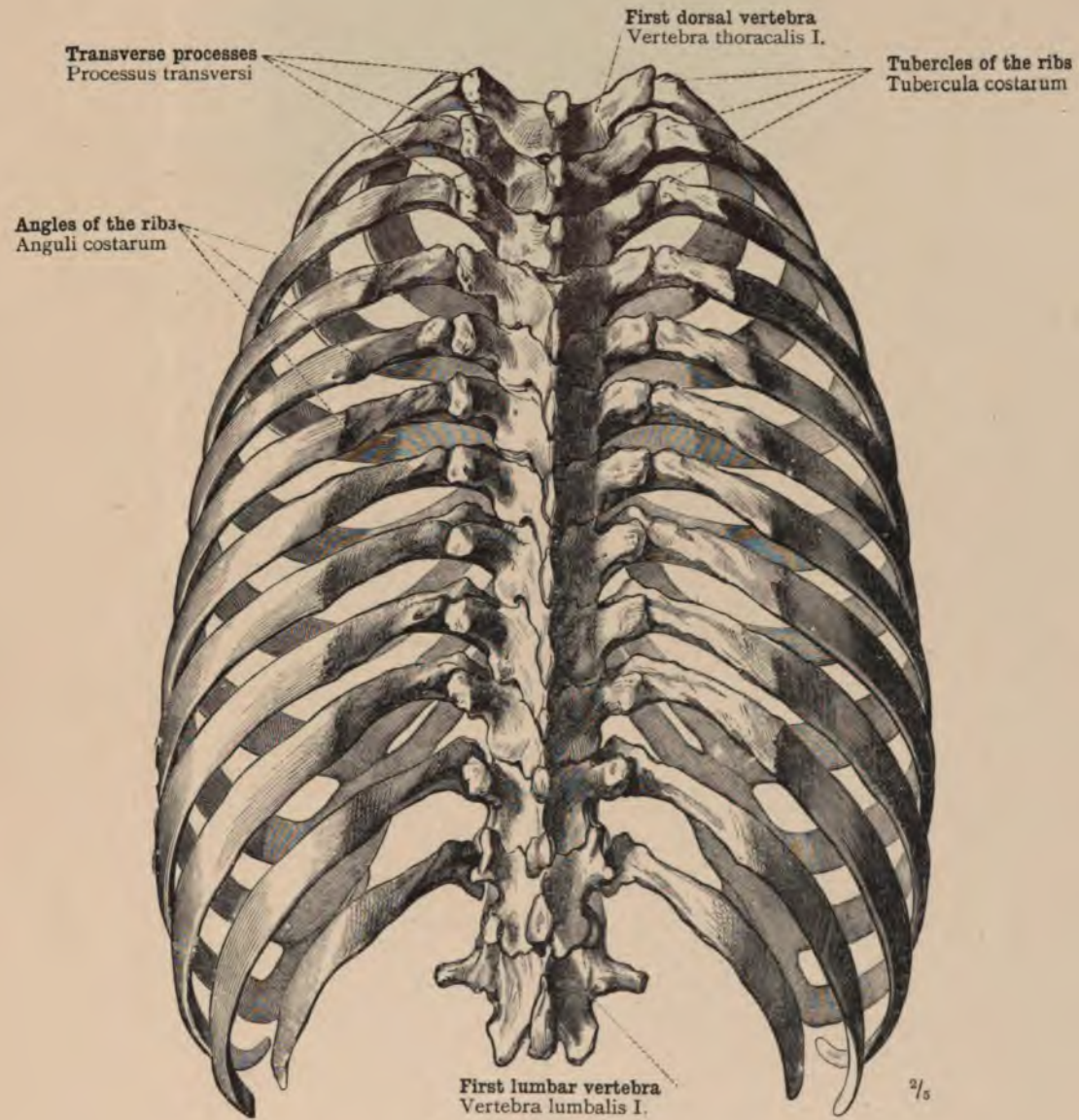


FIG. 80.—THE THORAX SEEN FROM BEHIND.

The Thorax.

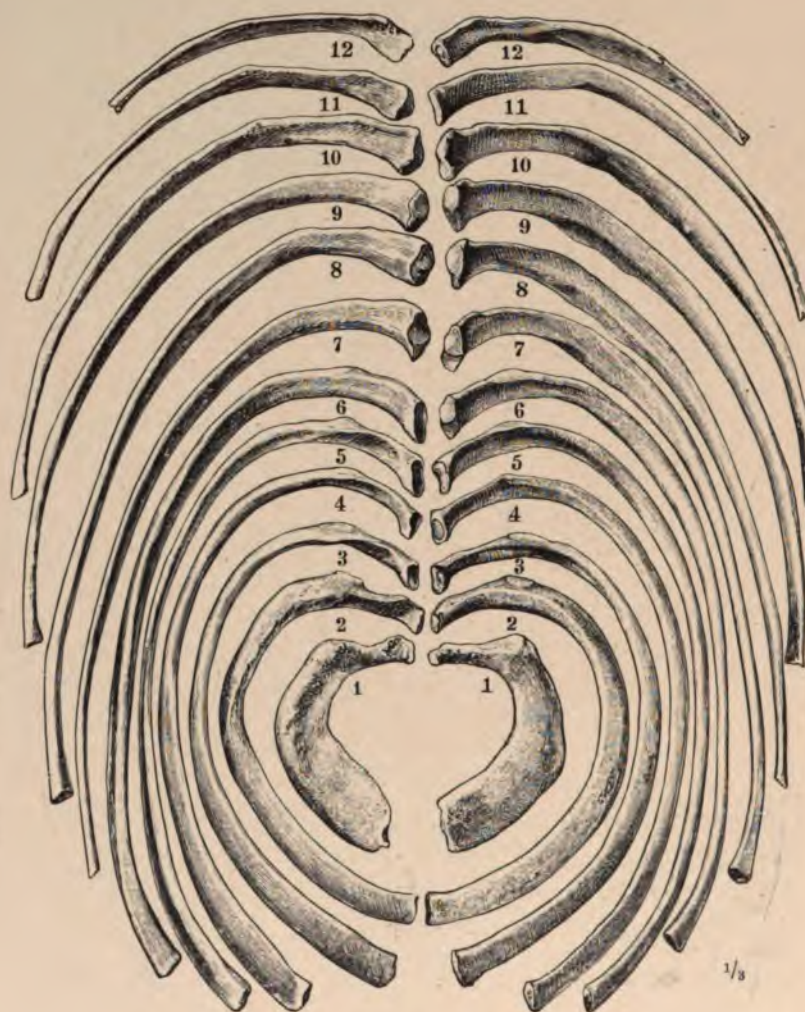


FIG. 81.—THE TWELVE PAIRS OF RIBS.

Ossa costalia—The ribs.

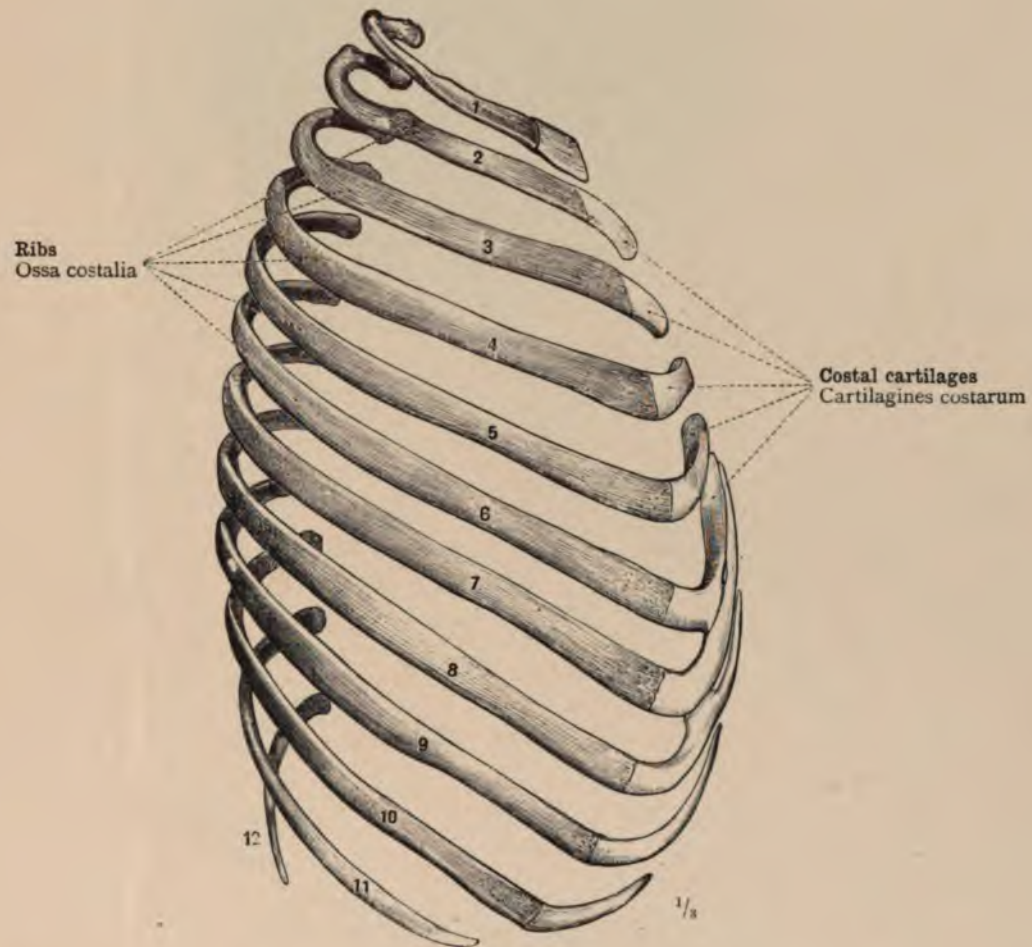


FIG. 82.—THE TWELVE RIBS OF THE RIGHT SIDE IN THEIR NATURAL POSITION.
SEEN FROM THE RIGHT.

Costæ—The ribs.

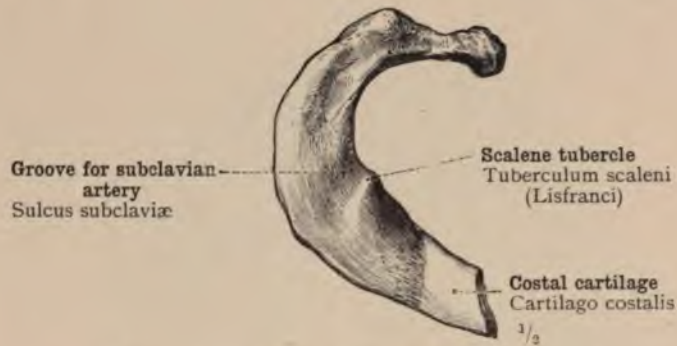


FIG. 83.—FIRST (RIGHT) RIB. SEEN FROM ABOVE.



FIG. 85.—FOURTH (RIGHT) RIB. SEEN FROM BEHIND.

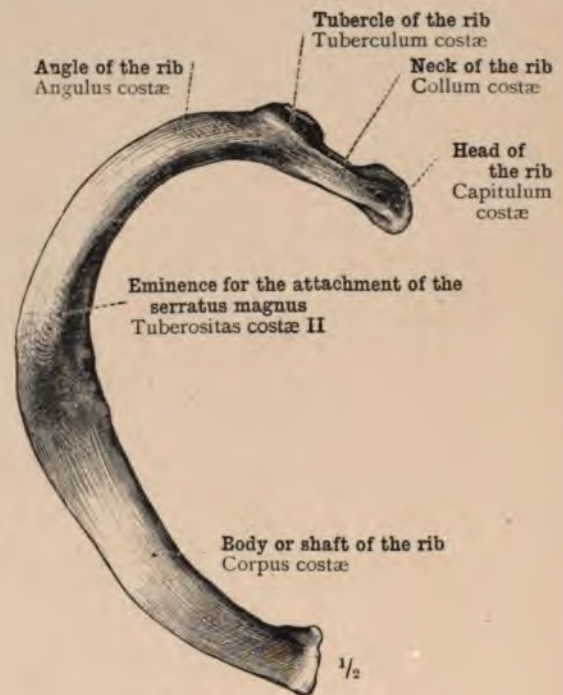


FIG. 84.—SECOND (RIGHT) RIB. SEEN FROM ABOVE.

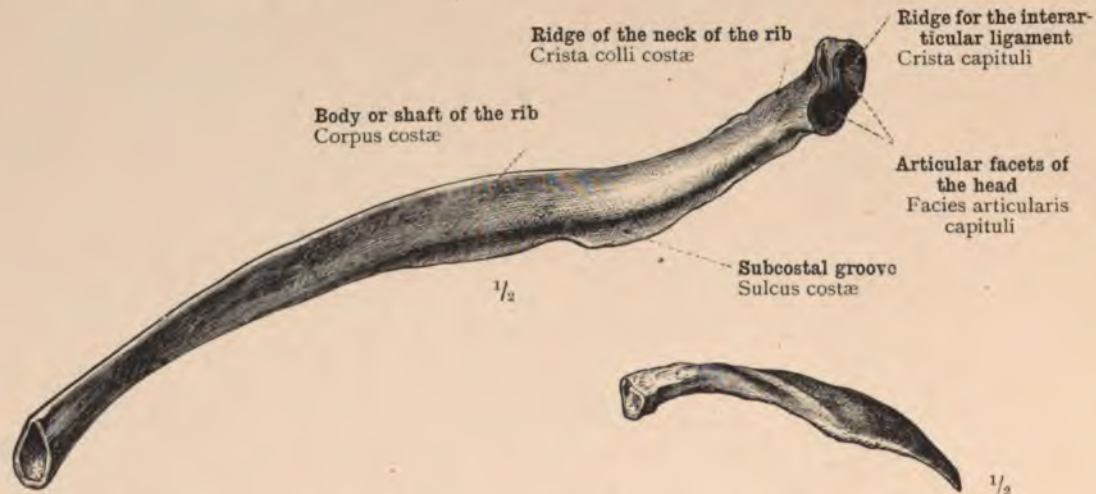


FIG. 86.—SEVENTH (RIGHT) RIB. SEEN FROM WITHIN.

FIG. 87.—TWELFTH (RIGHT) RIB. SEEN FROM WITHIN.

Costæ—The ribs.



¹ In certain pathological conditions the angle between the manubrium and the body of the sternum becomes less obtuse, and therefore more prominent. It is then known as *angulus Ludovici*, or Ludwig's angle.—Tr.

FIG. 88.—THE STERNUM SEEN FROM BEFORE.

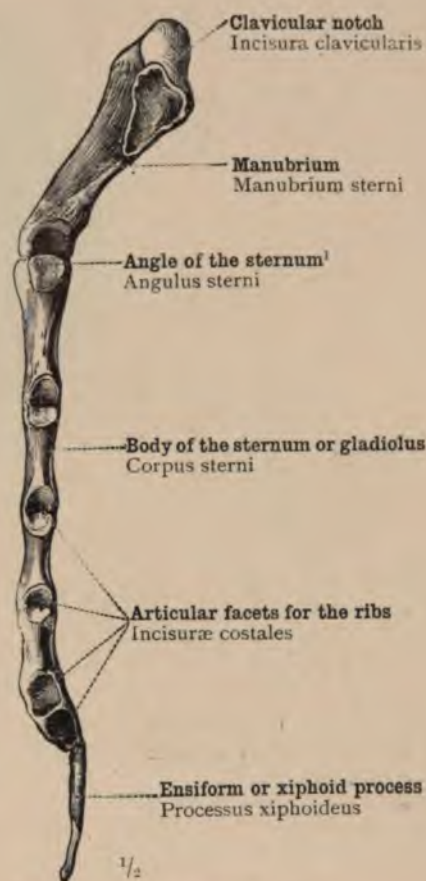


FIG. 89.—THE STERNUM SEEN FROM THE LEFT SIDE.

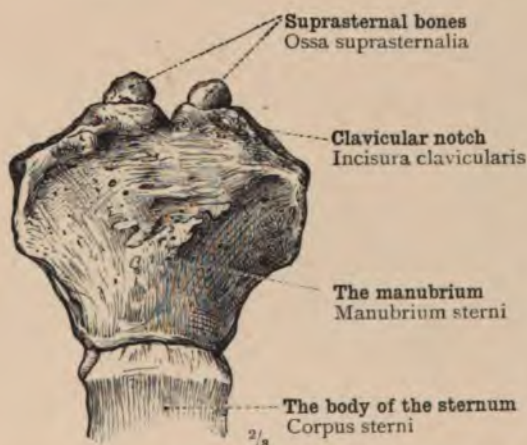


FIG. 90.—THE UPPER PORTION OF THE STERNUM WITH THE SUPRASTERNAL BONES (A RARE VARIETY). SEEN FROM BEFORE.

Sternum—The breast-bone.



FIG. 91.—POSTERIOR PORTION OF THE SIXTH RIB, IN THE FIFTEENTH YEAR.

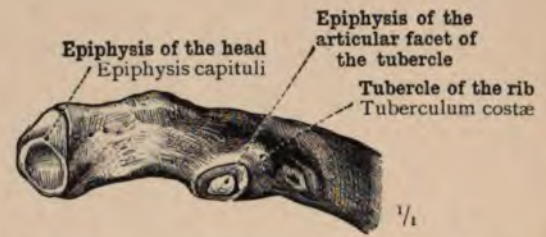


FIG. 92.—POSTERIOR PORTION OF THE SIXTH RIB, IN THE EIGHTEENTH YEAR.

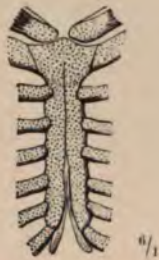


FIG. 93.—DIVIDED PRIMITIVE CARTILAGE OF THE STERNUM.

From a human foetus of two months (months of four weeks each).



FIG. 94.—PRIMITIVE CARTILAGE OF THE STERNUM.

From a human foetus of four months (months of four weeks each).



FIG. 95.—PRIMITIVE CARTILAGE OF THE STERNUM WITH THE FIRST CENTRE OF OSSIFICATION IN THE MANUBRIUM.

From a human foetus in the second half of the sixth month (months of four weeks each).



FIG. 96.—CENTRES OF OSSIFICATION IN THE STERNUM OF A NEW-BORN CHILD.



FIG. 97.—STERNUM OF A BOY AT THE AGE OF ELEVEN YEARS.

Development of the Ribs and the Sternum.

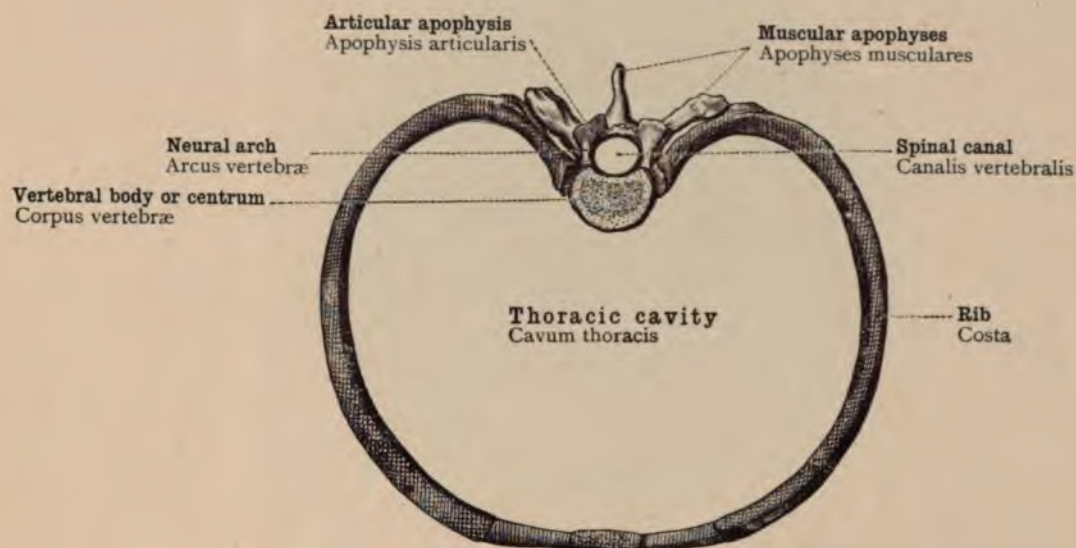


FIG. 98.—SKELETON OF A THORACIC SEGMENT.

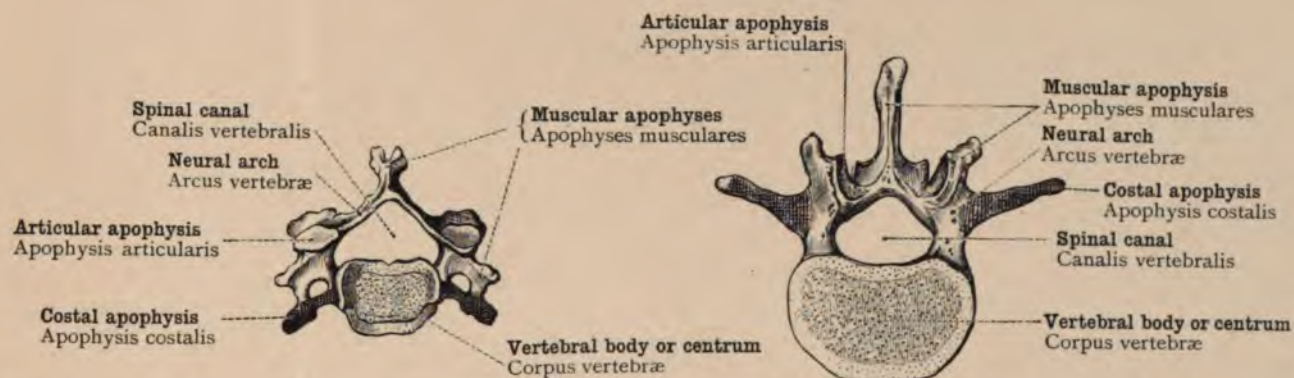


FIG. 99.—SKELETON OF A CERVICAL SEGMENT.

FIG. 100.—SKELETON OF A LUMBAR SEGMENT.

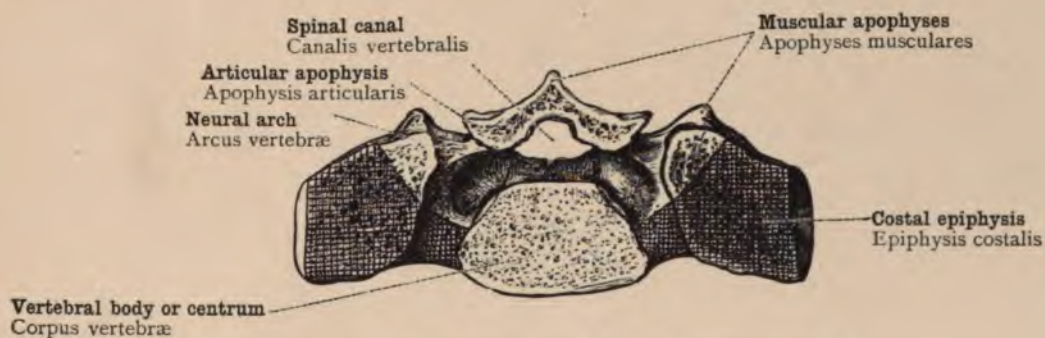


FIG. 101.—SKELETON OF A SACRAL SEGMENT.

The Homologous Skeletal Parts of the Segments of the Body.

CRANIUM ET OSSA CRANII
THE SKULL
AND THE BONES OF THE SKULL

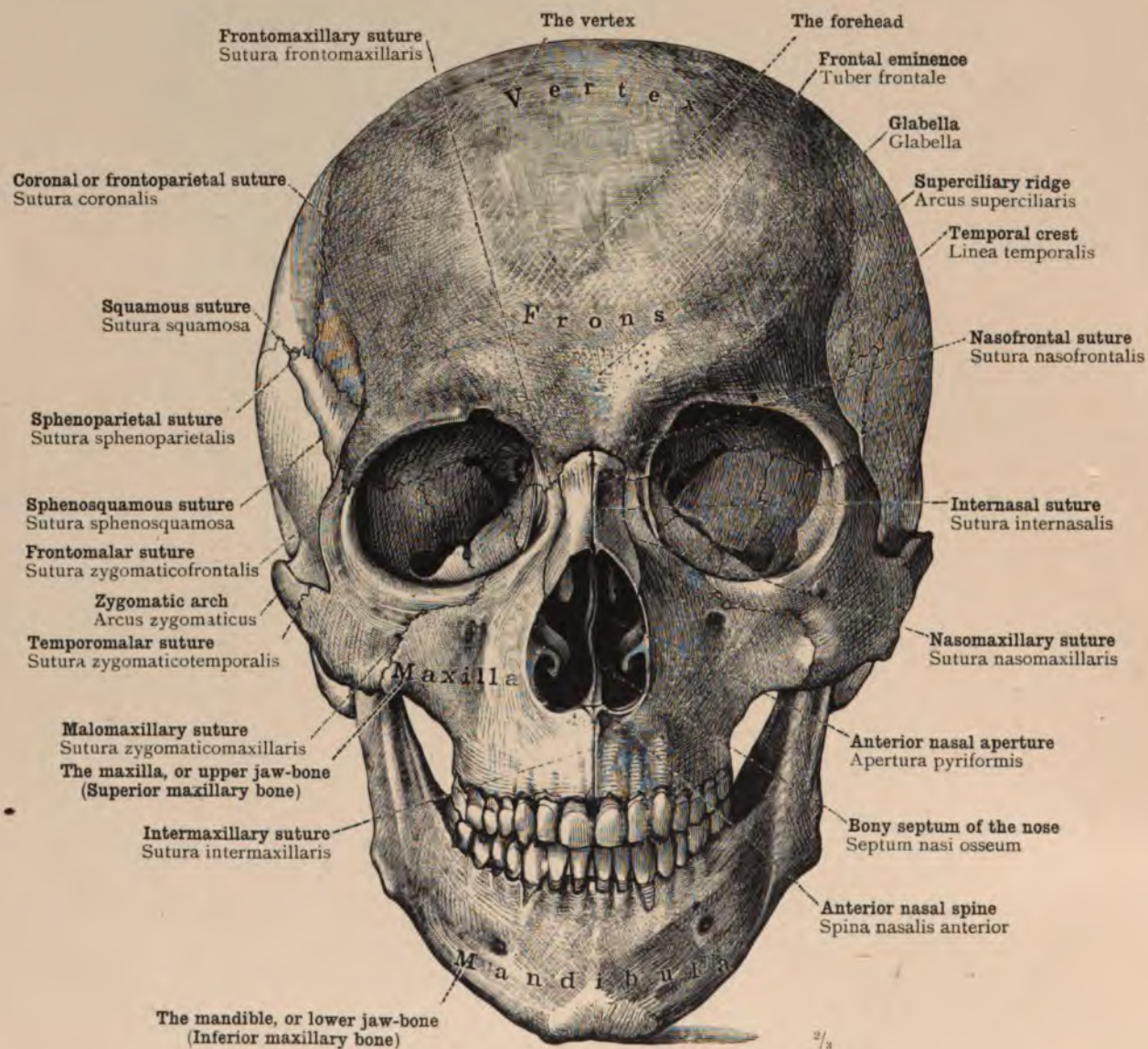


FIG. 102.—THE SKULL SEEN FROM BEFORE: NORMA FRONTALIS.

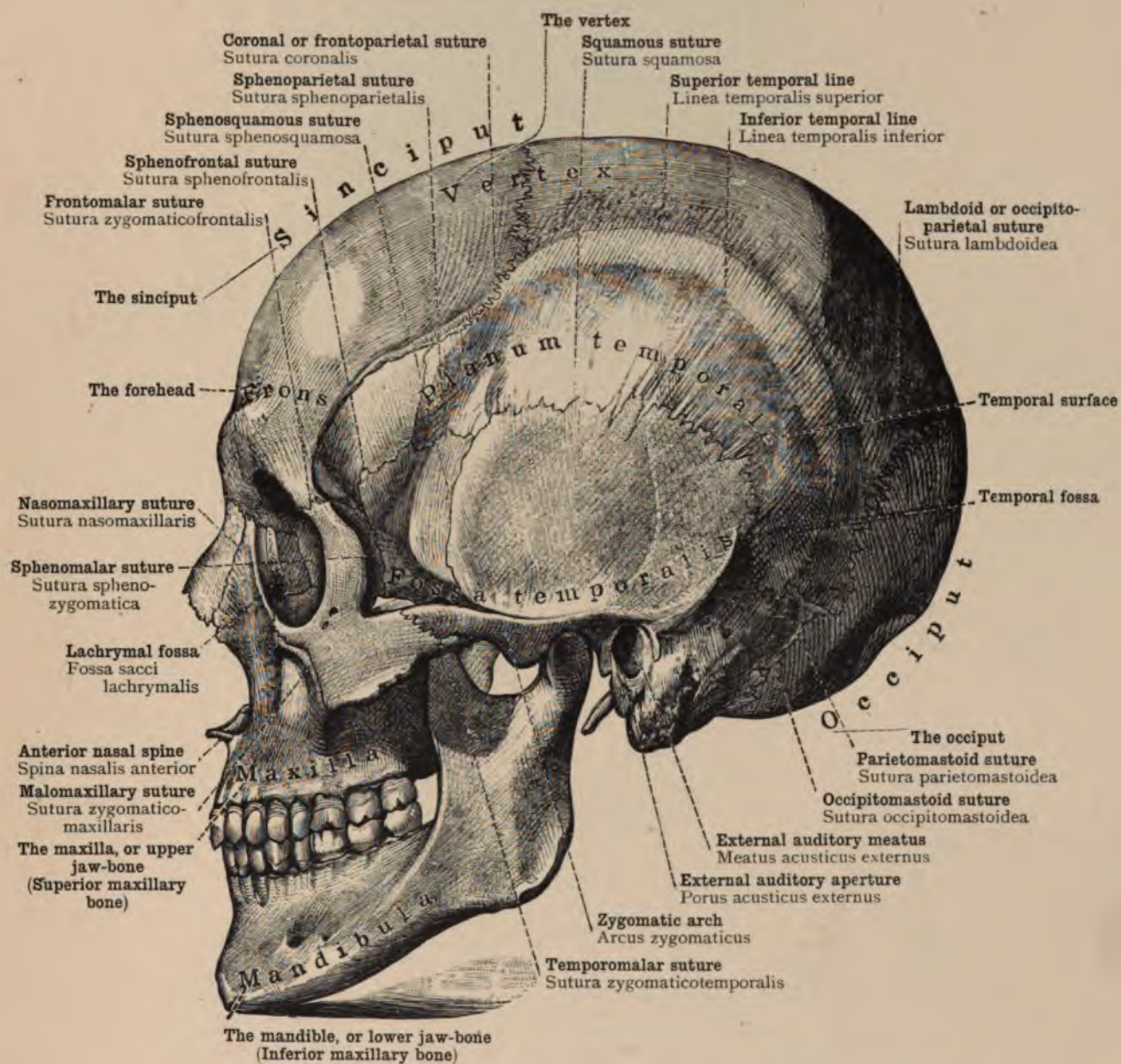
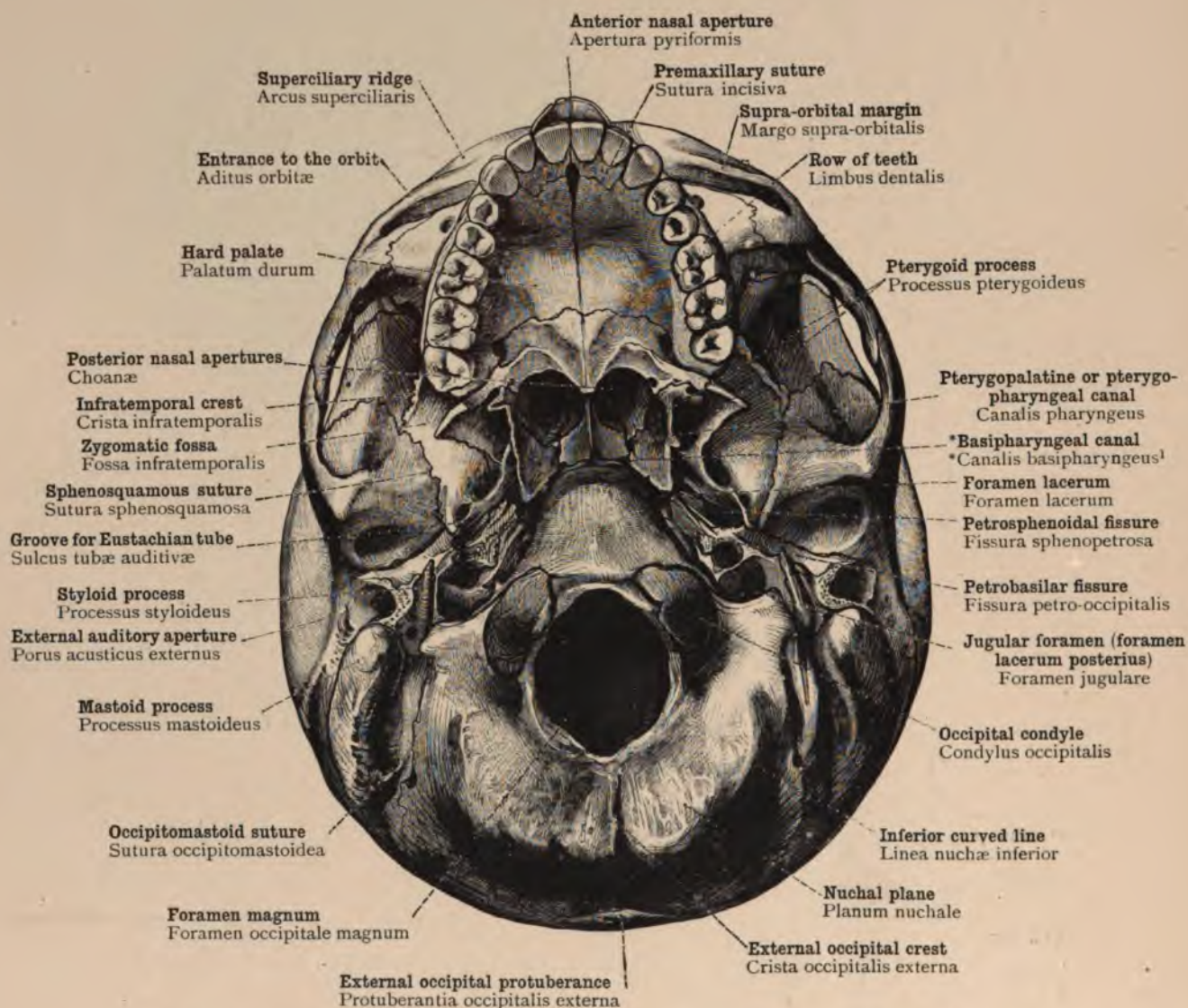


FIG. 103.—THE SKULL SEEN FROM THE LEFT SIDE: NORMA LATERALIS.

Cranium—The skull.



¹ **Canalis basipharyngeus*, * basipharyngeal canal: This term is not used by English anatomists, nor even is the canal itself mentioned by Quain. Macalister, however, in his description of the vomer, writes (p. 233): "In the region of its sphenoidal articulation there are three canals transmitting small vessels in the young skull, which usually become obliterated with advancing age; these are—one median vomerine canal between the vomer and the root of the rostrum, and a lateral on each side between the extremity of the ala vomeris and the vaginal process. These run parallel to, and may communicate with, the pterygopharyngeal [pterygopalatine] canal in the vaginal process." The two lateral canals here mentioned are those called by Toldt **canales basipharyngei*.—Tr.

FIG. 104.—EXTERNAL ASPECT OF THE BASE OF THE SKULL: BASIS CRANII EXTERNA.

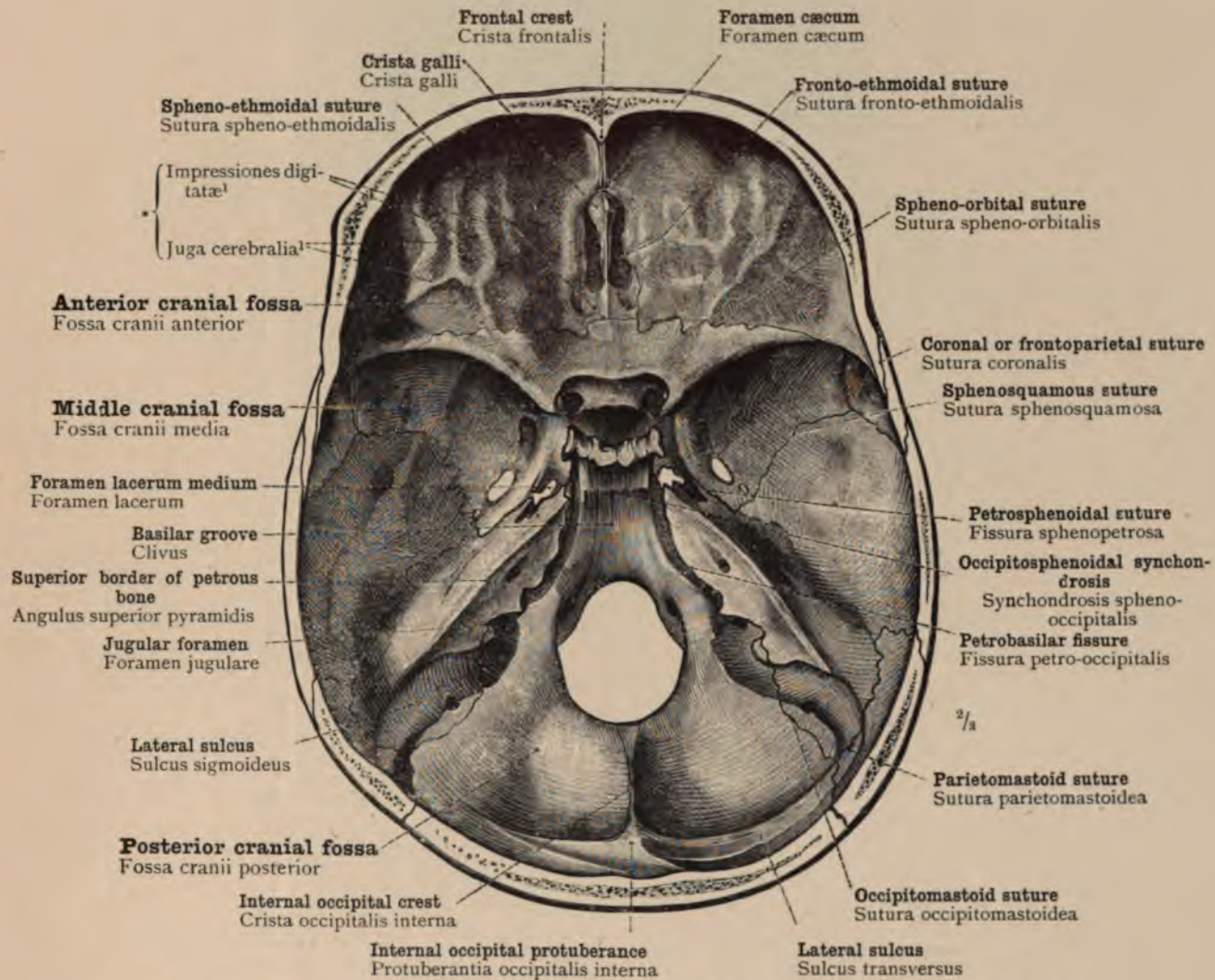


FIG. 105.—INTERNAL ASPECT OF THE BASE OF THE SKULL—BASIS CRANII INTERNA: FOSSÆ CRANII ANTERIOR, MEDIA, ET POSTERIOR—THE ANTERIOR, MIDDLE, AND POSTERIOR CRANIAL FOSSÆ. SEEN FROM ABOVE.

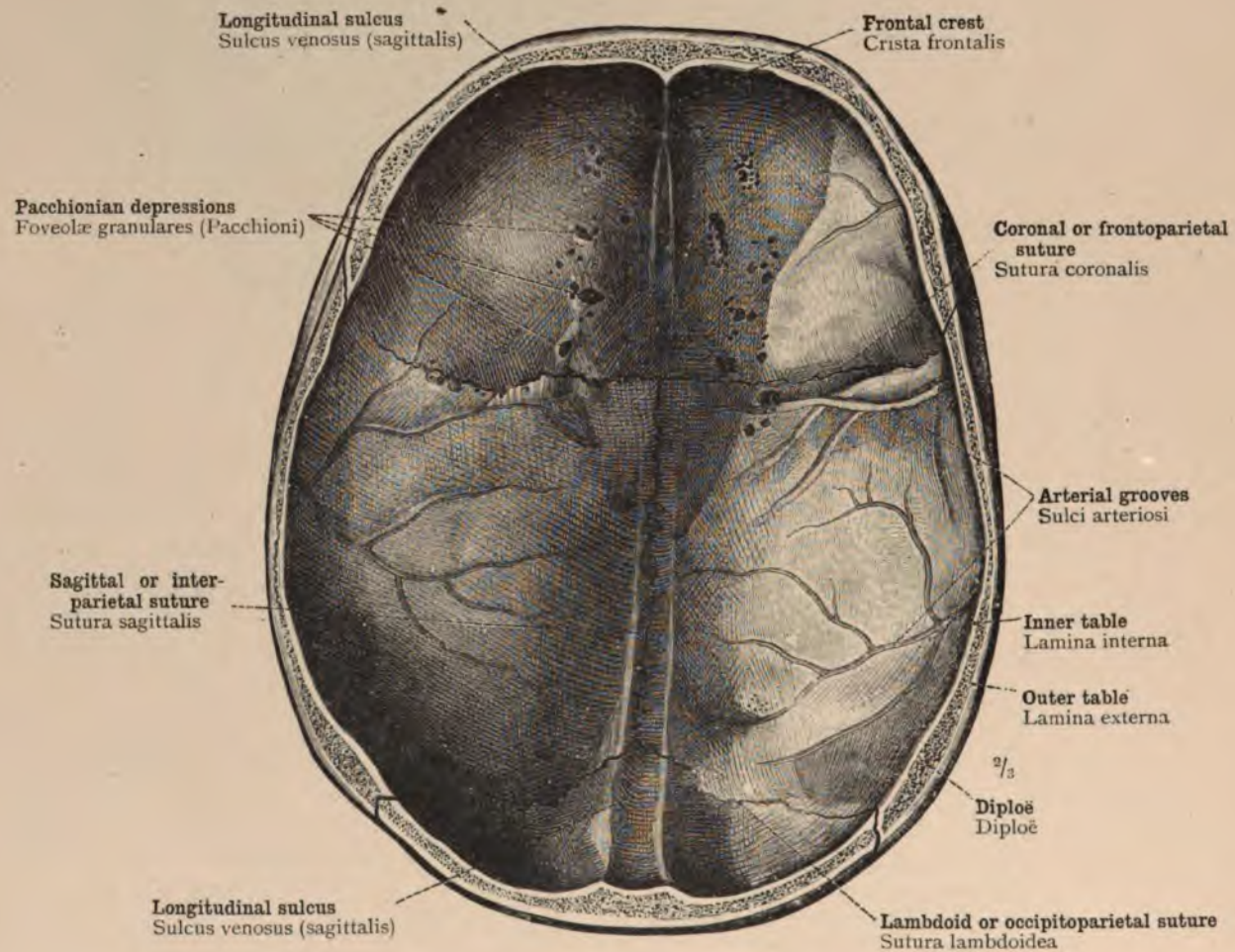


FIG. 106.—CALVARIA—THE SKULLCAP, OR ROOF OF THE SKULL. INNER ASPECT.

Cranium—The skull.

YRABLI 3MAJ

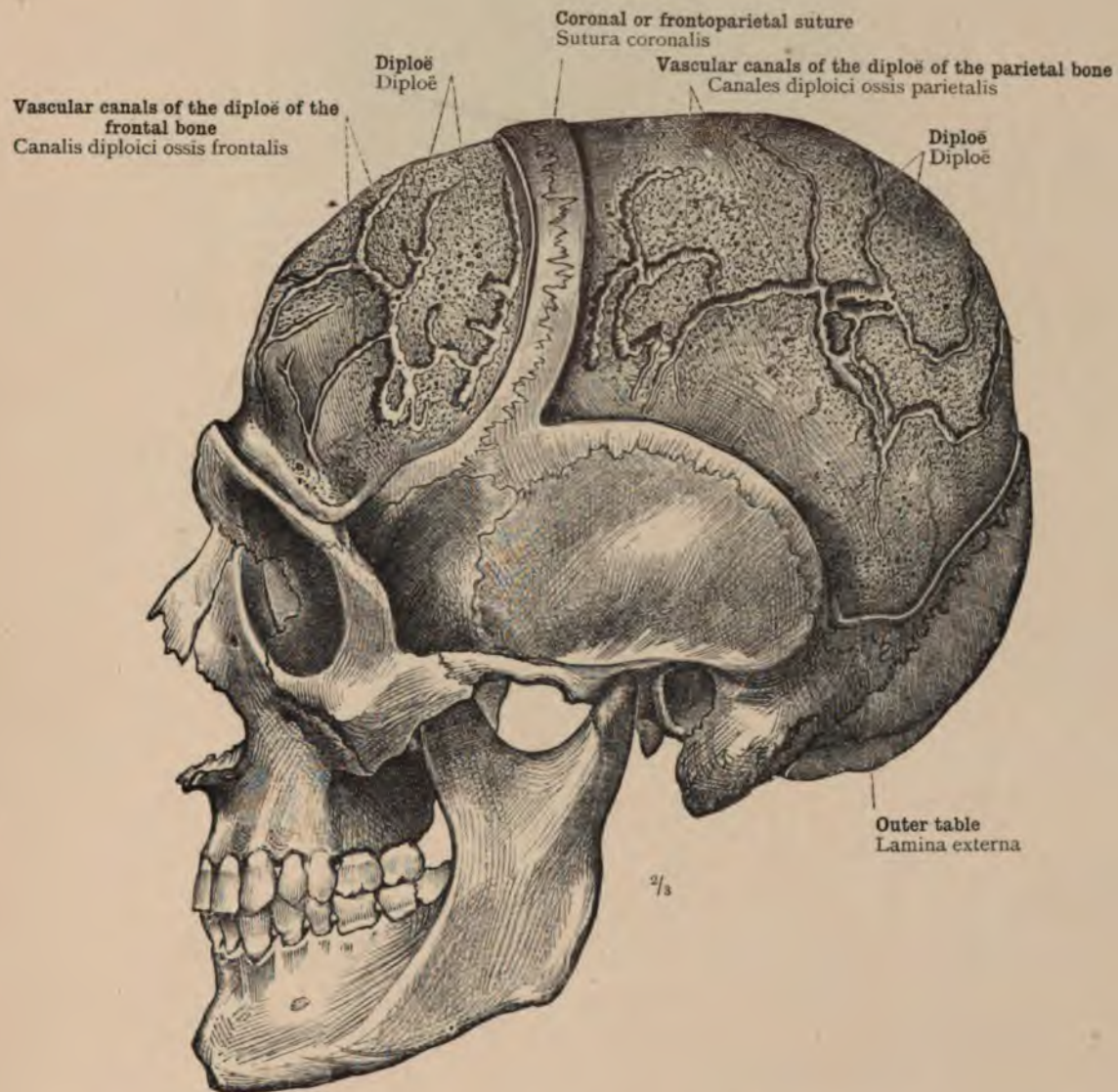


FIG. 107.—VASCULAR CANALS OF THE DIPLOË OF THE ROOF OF THE SKULL, SHOWN BY REMOVAL OF THE OUTER TABLE OF COMPACT BONE FROM THE FRONTAL BONE AND THE PARIETAL BONE: CANALES DIPLOICI (BRESCHETI). * SEEN FROM THE LEFT SIDE.

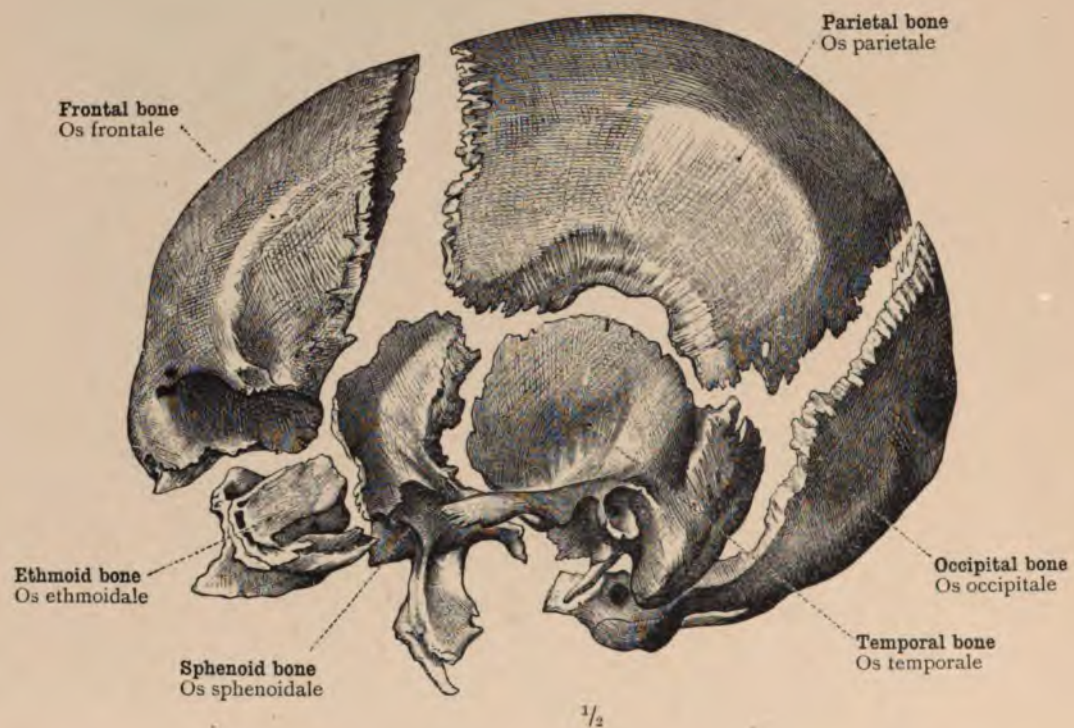


FIG. 108.—THE SEPARATE BONES OF WHICH THE CRANIUM CEREBRALE OR CRANIUM PROPER CONSISTS.

Ossa cranii cerebialis—Bones of the cranium proper.

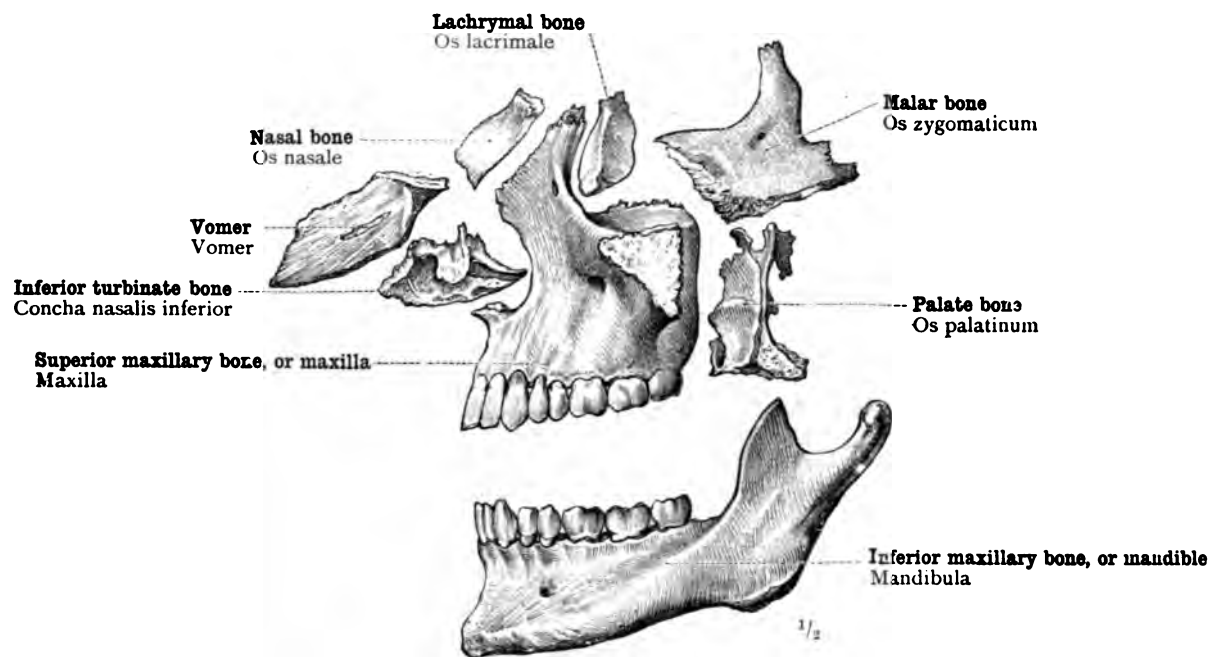


FIG. 109.—THE SEPARATE BONES OF WHICH THE CRANIUM VISCERALE (FACIES OSSEA), OR FACIAL PORTION OF THE SKULL, CONSISTS.

Ossa faciei—Bones of the face.

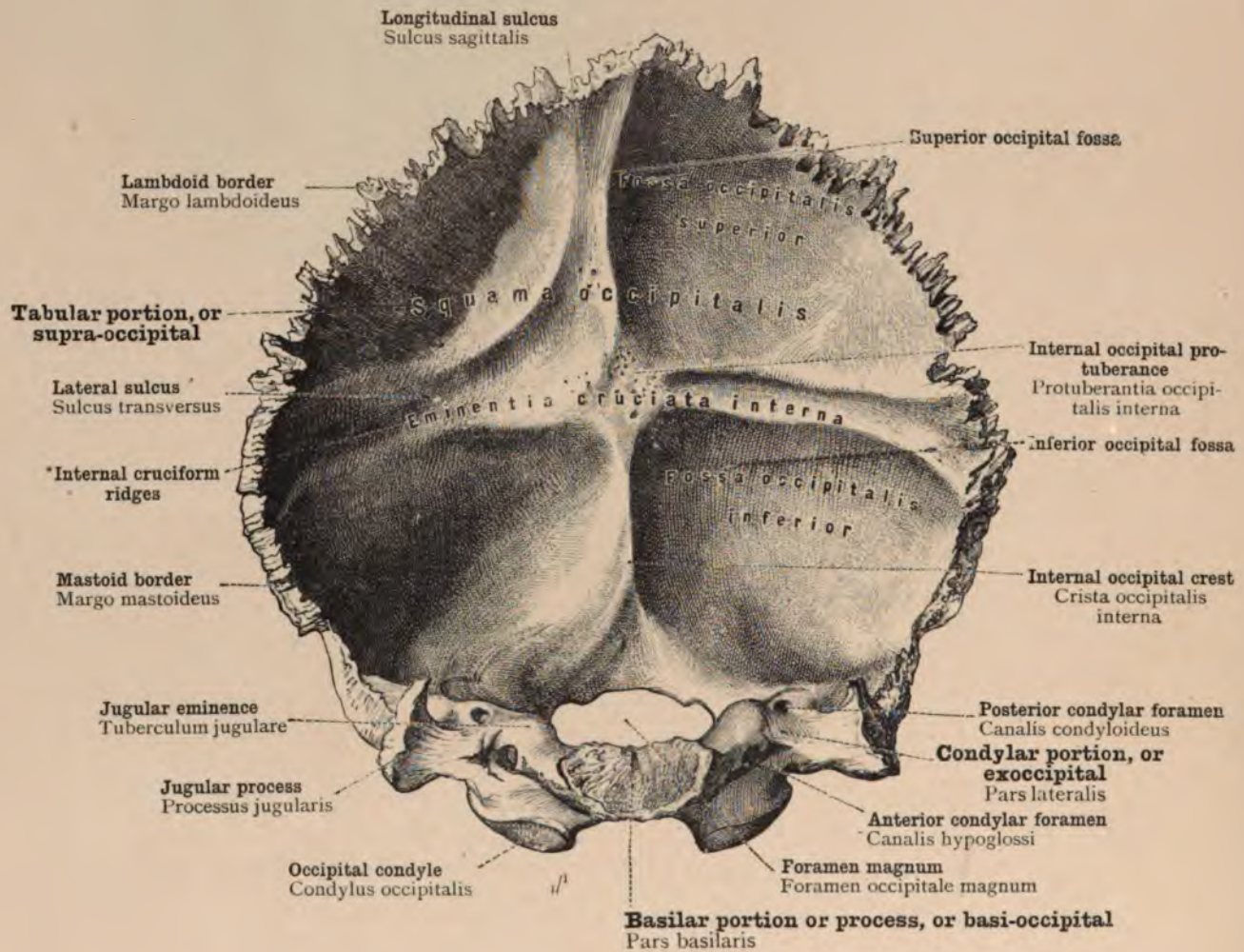
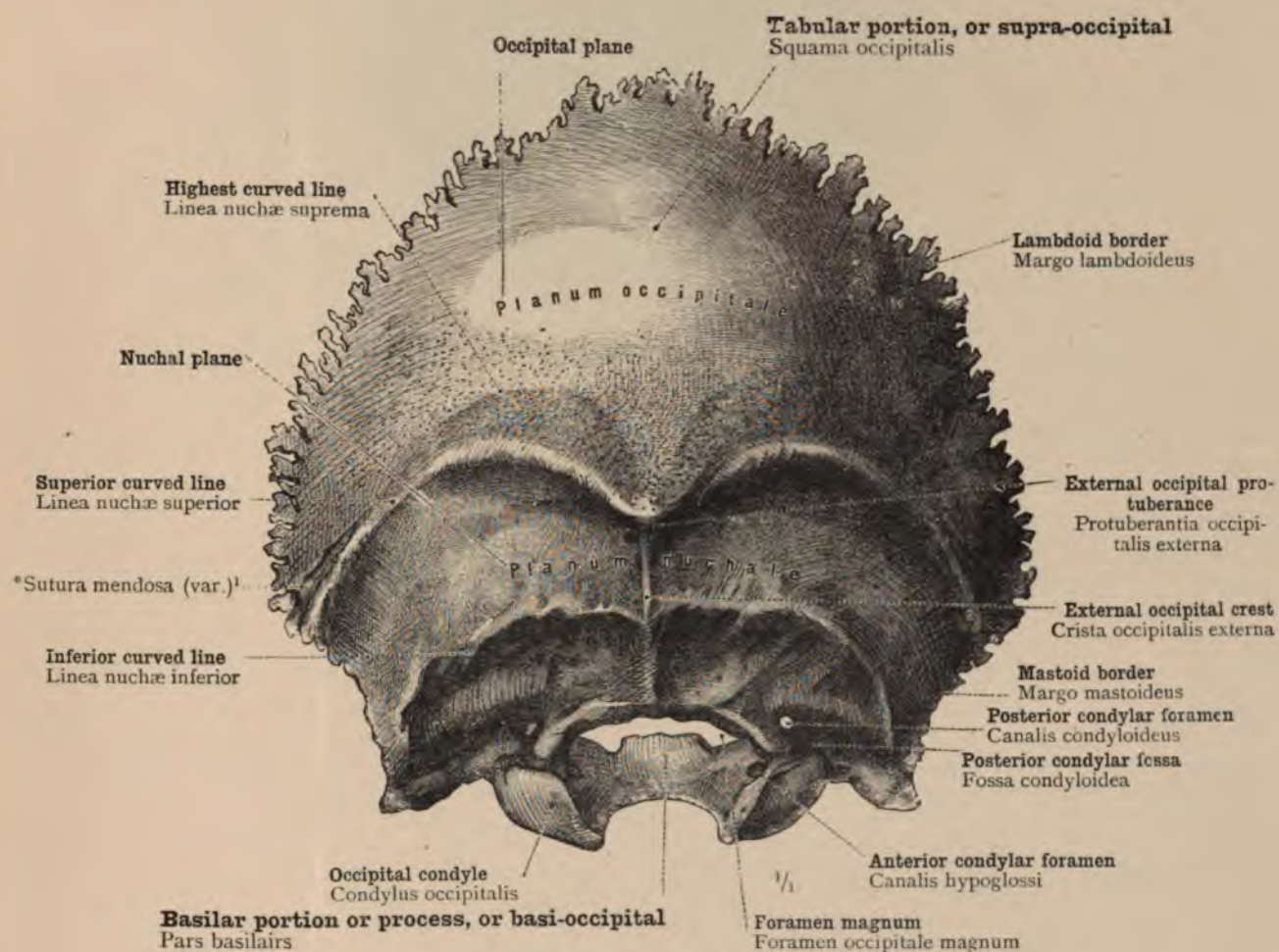


FIG. 110.—ANTERIOR (INTERNAL) ASPECT OF THE OCCIPITAL BONE.

Os occipitale—The occipital bone.



¹ See foot-note to p. 57.

FIG. III.—POSTERIOR (EXTERNAL) ASPECT OF THE OCCIPITAL BONE.

Os occipitale—The occipital bone.

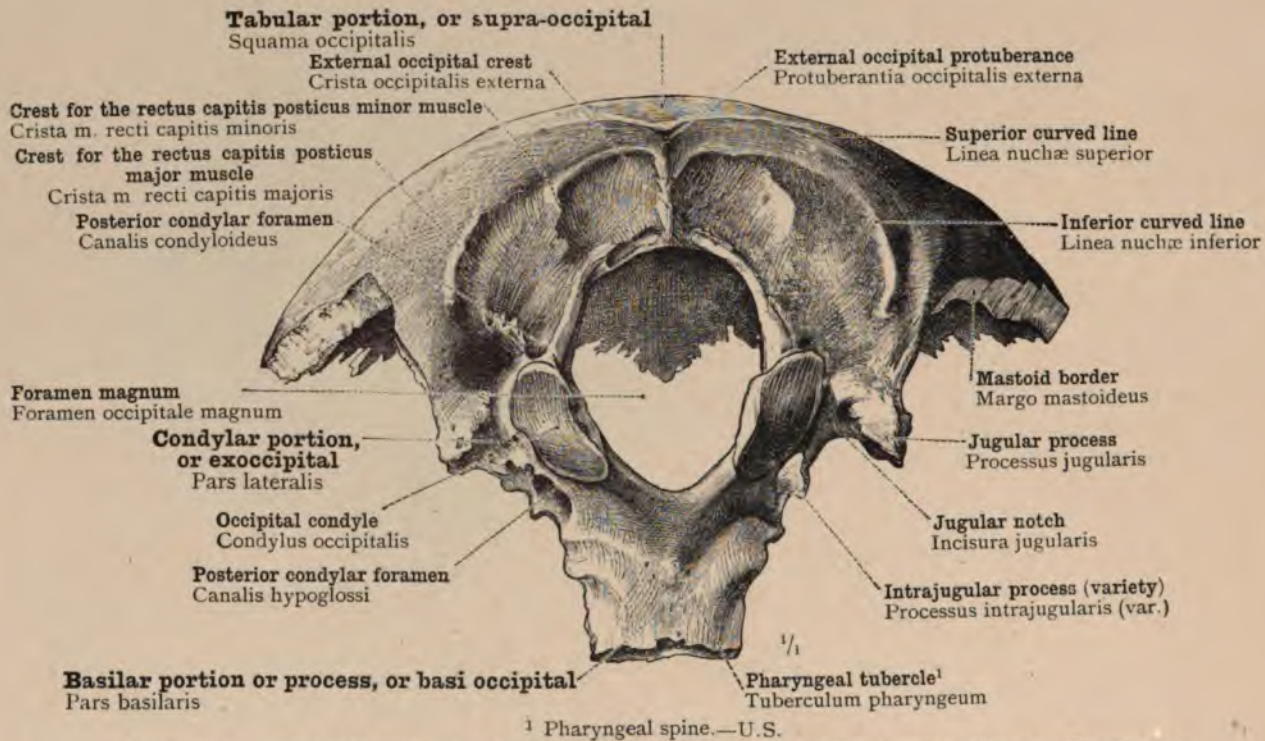


FIG. 112.—THE OCCIPITAL BONE SEEN FROM BELOW (EXTERNAL BASAL SURFACE).

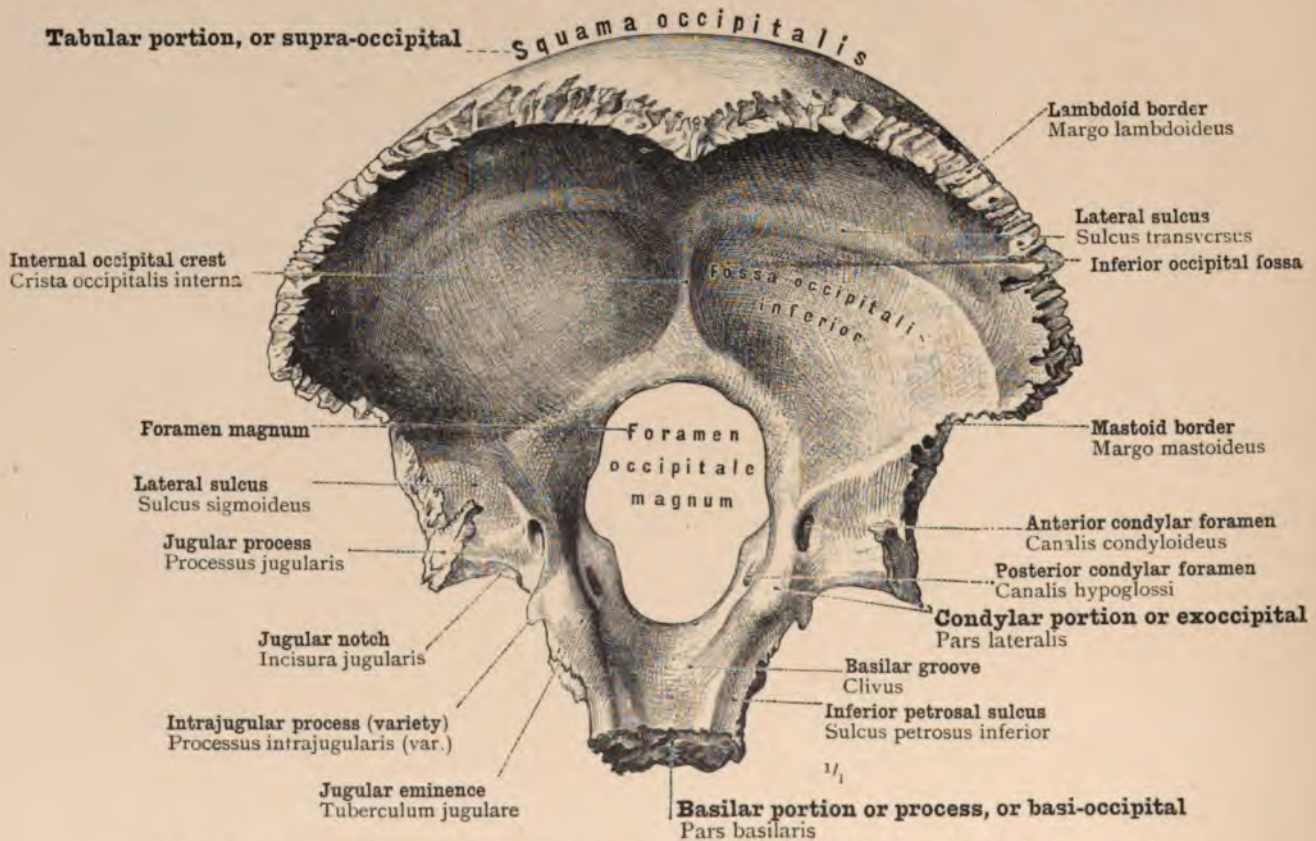


FIG. 113.—THE OCCIPITAL BONE SEEN FROM ABOVE (INTERNAL BASAL SURFACE).

Os occipitale—The occipital bone.

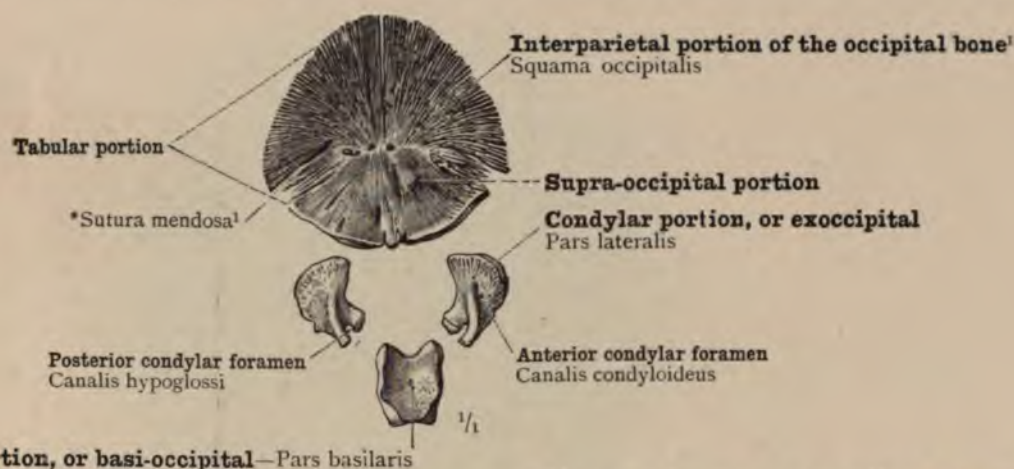


FIG. 114.—THE PORTIONS OF THE OCCIPITAL BONE FROM A HUMAN FŒTUS AT THE END OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH). SEEN FROM WITHIN.

Body-length, 12 inches.

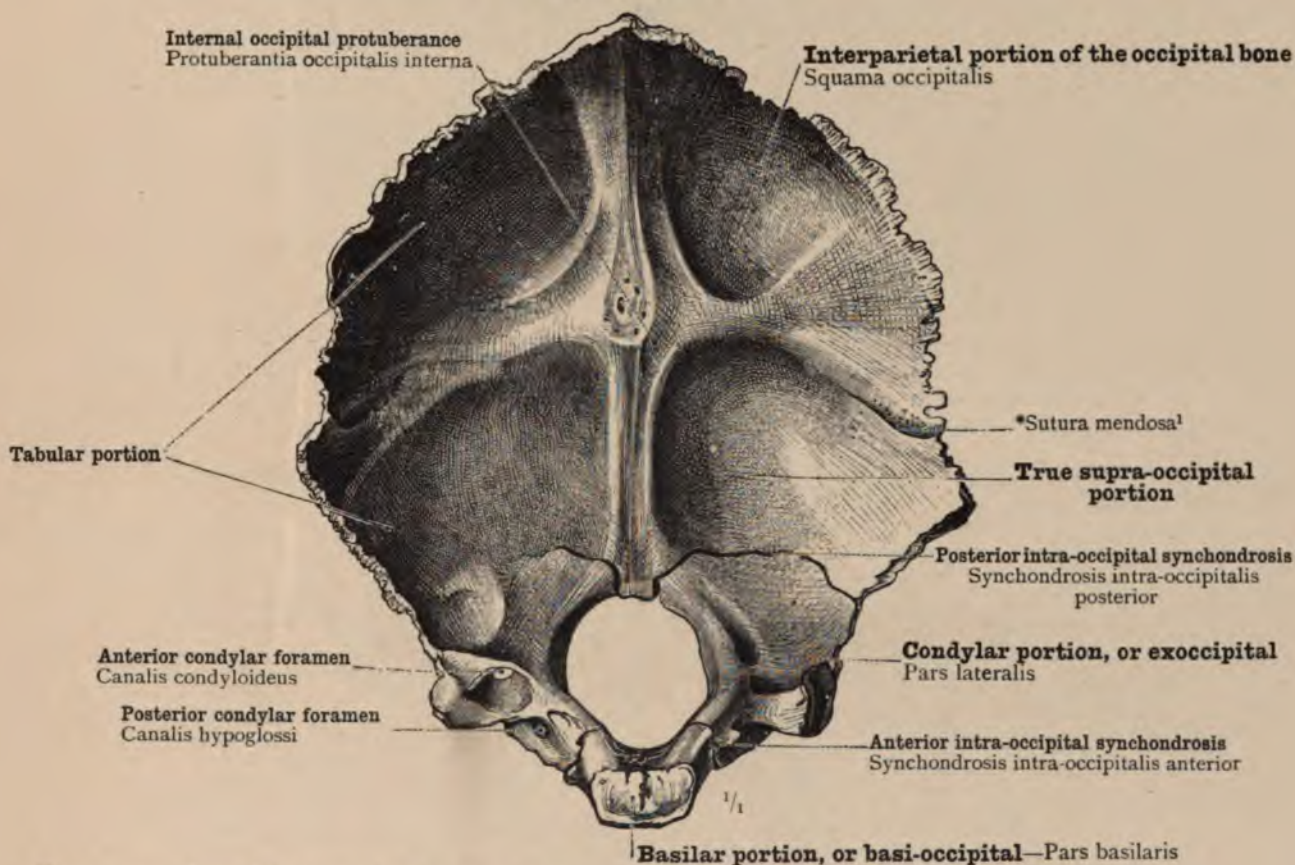
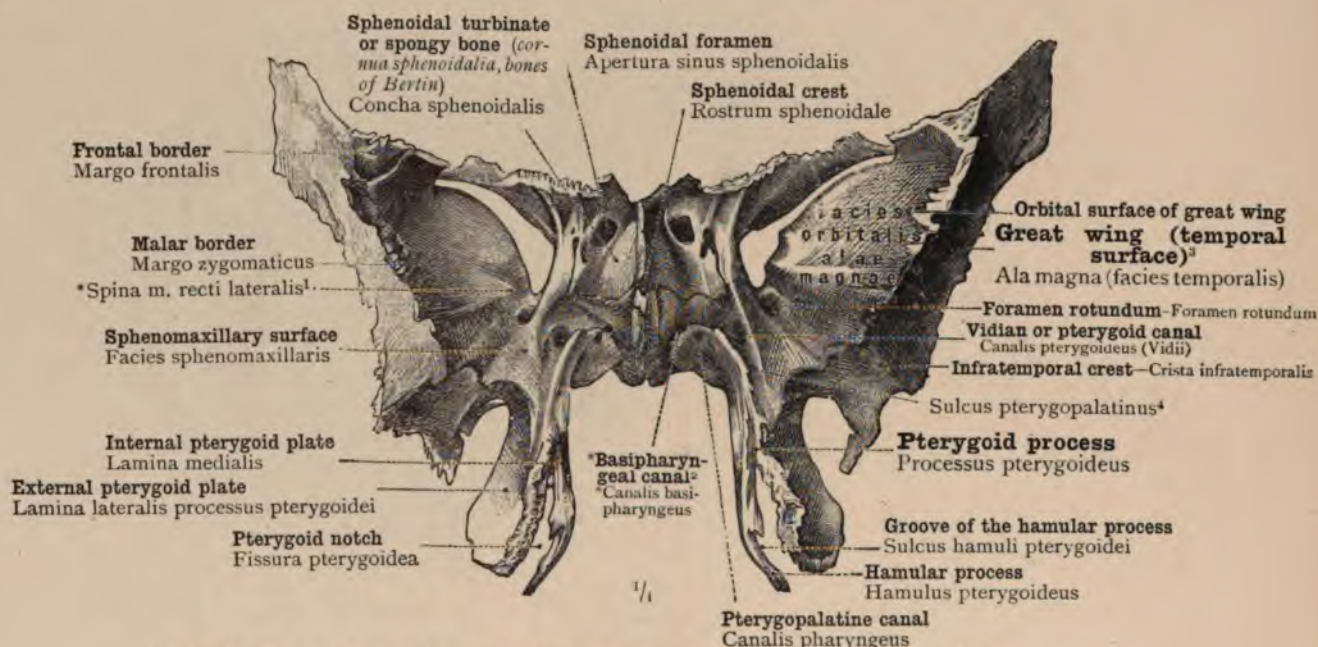


FIG. 115.—THE OCCIPITAL BONE OF A CHILD AGED FIFTEEN MONTHS. SEEN FROM WITHIN.

¹ The human occipital bone consists of four elements, which are still separate at birth, being united by intervening cartilage; these are, the *basilar* portion (basilar process), the two *condylar* portions, and the *tabular* portion. In comparative anatomy these are known respectively as *basi-occipital*, *exoccipitalis*, and *supra-occipital*. The basi-occipital and the exoccipitals ossify each from a single nucleus; the supra-occipital ossifies from four nuclei, an upper pair and a lower. These soon unite, but leave for some time fissures running in along the superior curved line. Not uncommonly this fissure persists on one or both sides through life, and in rare cases there is a persistent suture running right across and dividing the tabular portion of the occipital bone into two parts (*Sutura mendosa; see Figs. 111 and 114). Of these two parts, the lower, which belongs to the base of the skull and ossifies in cartilage, is the proper *supra-occipital* element, homologous with the *supra-occipital bone* of other vertebrata; whilst the upper, which belongs to the vertex of the skull and ossifies in membrane, represents the *interparietal bone* of many animals. This part alone is entitled to the name *squama occipitalis*, a term, however, little used by English anatomists. The occasional persistence of the suture between the interparietal and supra-occipital elements of the occipital bone is of surgical importance, since, in cases of injury to the back of the head, it is, if present, liable to be mistaken for fracture.—Tr.



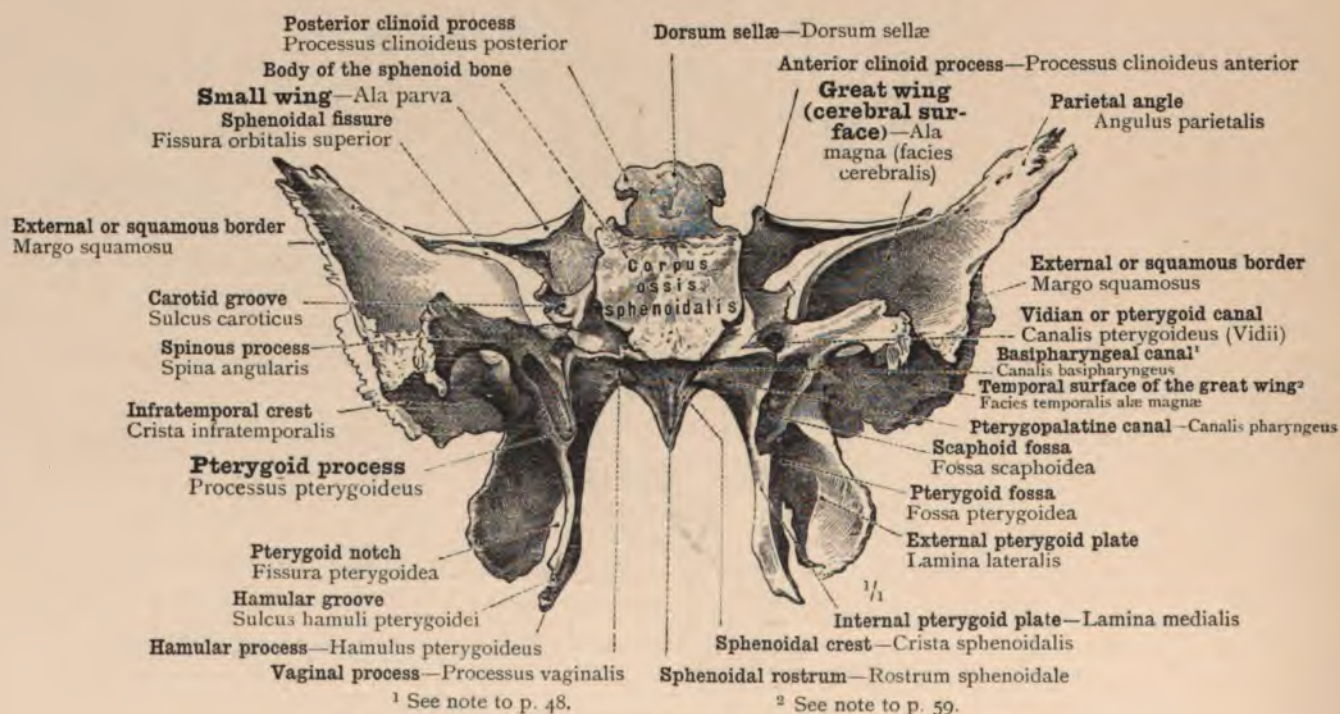
¹ Spine for the attachment of the lower head of the external rectus muscle of the eyeball.

² See note to p. 48.

³ See note to p. 59.

⁴ As mentioned in the Preface, the canal called by English anatomists *palatomaxillary* or *posterior palatine canal* is by Toldt called *pterygopalatine canal*. The inner grooved portion of the sphenomaxillary surface, which he here calls the *pterygopalatine groove*, leads down into that canal, but does not form a part of it, since it lies between the palate bone and the superior maxillary bone.—Tr.

FIG. 116.—THE SPHENOID BONE SEEN FROM BEFORE.



¹ See note to p. 48.

² See note to p. 59.

FIG. 117.—THE SPHENOID BONE SEEN FROM BEHIND.

Os sphenoidale—The sphenoid bone.

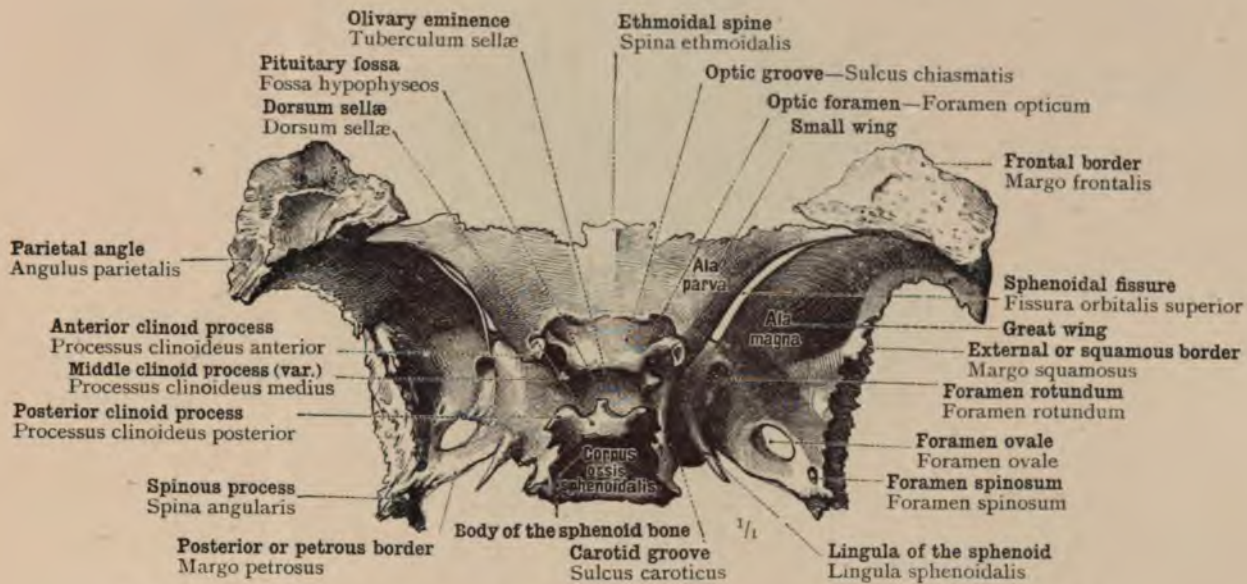
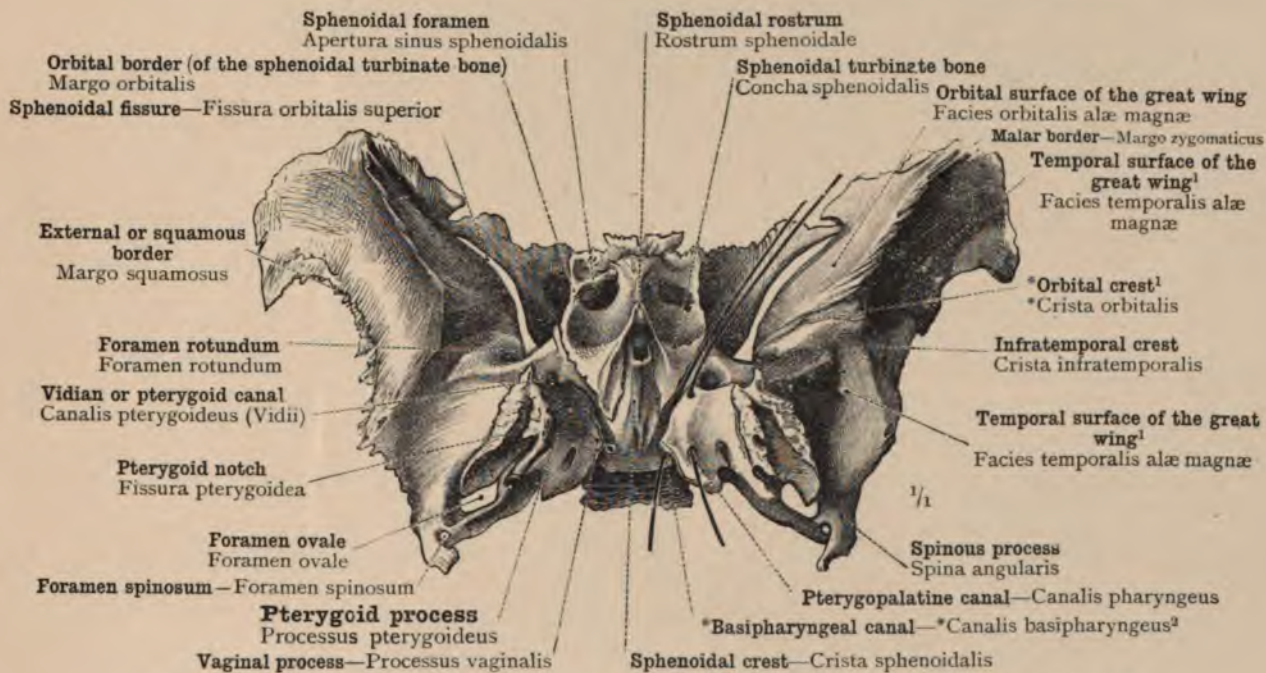


FIG. 118.—THE SPHENOID BONE SEEN FROM ABOVE (CEREBRAL ASPECT).

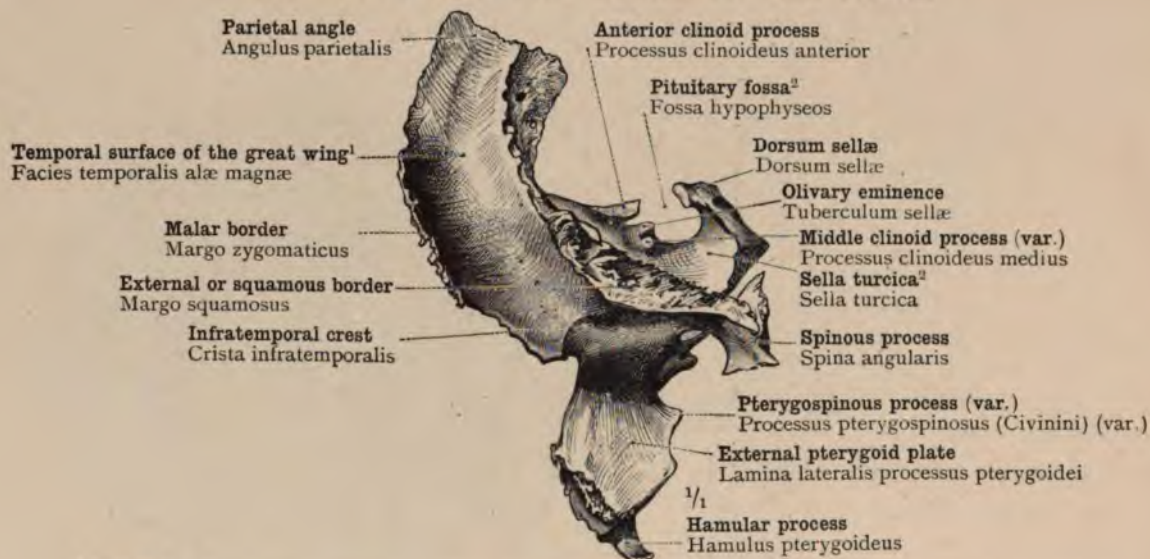


¹ The Continental nomenclature differs here from that of English anatomists. What is called by the author *facies temporalis alæ magnæ*, the temporal surface of the great wing, is in England known as the *temporozygomatic surface*, being divided by the *infratemporal crest* into an upper *temporal surface* and a lower *zygomatic surface*. As regards the term *crista orbitalis*, the orbital crest, this is not used by Quain at all, while Macalister applies it to the lower margin of the sphenoidal fissure, the free border separating the orbital from the cerebral surface of the great wing. Toldt, on the other hand, as an examination of Fig. 119 shows, means by *crista orbitalis* the posterior margin of the sphenomaxillary fissure, the free border separating the orbital from the zygomatic surface of the great wing.—Tr.

² See note to p. 48.

FIG. 119.—THE SPHENOID BONE SEEN FROM BELOW (EXTERNAL ASPECT).

Os sphenoidale—The sphenoid bone.



¹ See note to p. 59.
² English anatomists use the terms *pituitary fossa* and *sella turcica* as synonyms; Toldt, more accurately, distinguishes between them, meaning by *pituitary fossa* (*Fossa hypophyseos*) the deep pit on the upper surface of the body of the sphenoid bone which lodges the pituitary body or hypophysis cerebri, and by *sella turcica* the saddle-shaped surface which forms the floor of that fossa.—Tr.

FIG. 120.—THE SPHENOID BONE SEEN FROM THE LEFT SIDE (TEMPOROZYGOMATIC SURFACE).¹

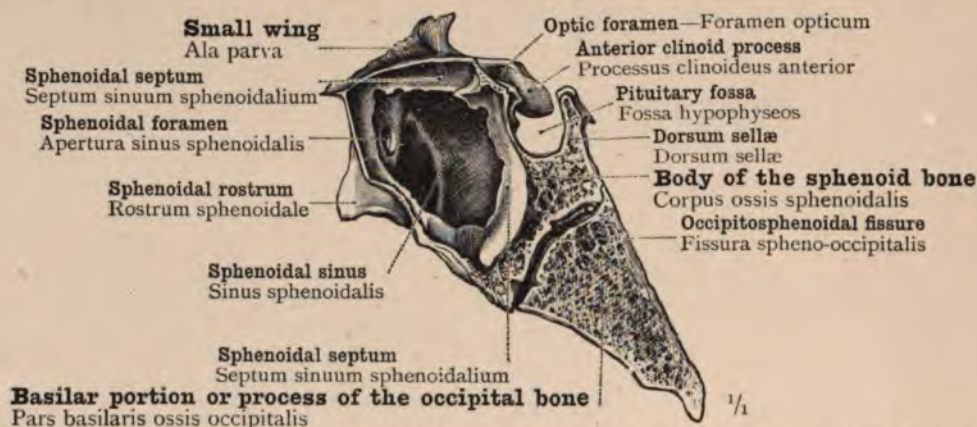


FIG. 121.—THE SPHENOIDAL SINUSES IN MEDIAN SAGITTAL SECTION, THE GREATER PART OF THE SPHENOIDAL SEPTUM HAVING BEEN REMOVED. SEEN FROM THE LEFT SIDE.

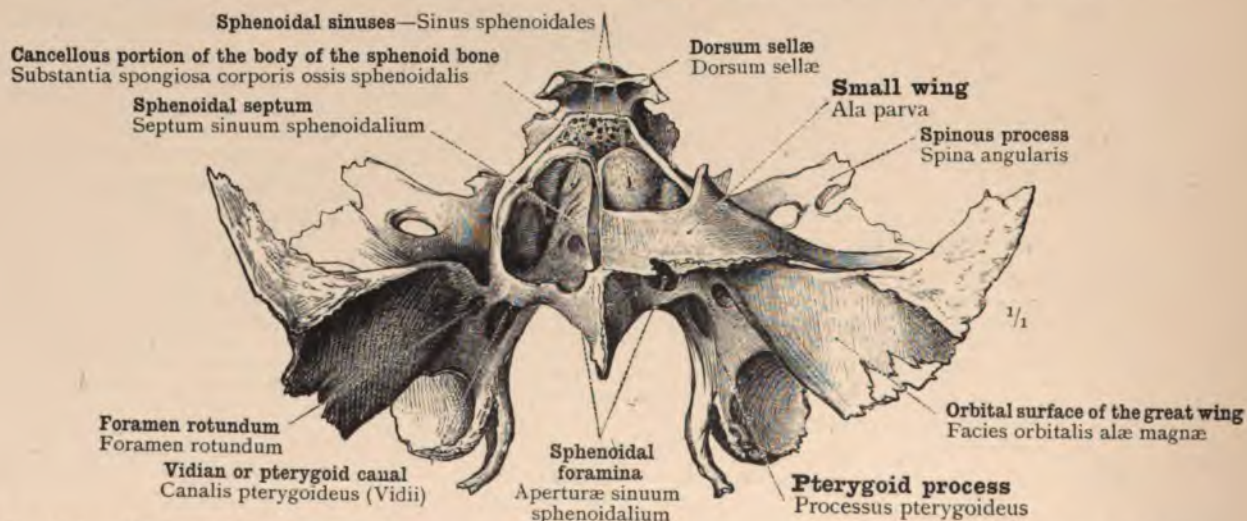


FIG. 122.—THE SPHENOIDAL SINUSES, EXPOSED FROM ABOVE BY THE REMOVAL OF THE INNER LAMELLA OF COMPACT BONE.

The right sinus is opened from above; the left is unopened.

Os sphenoidale—The sphenoid bone.

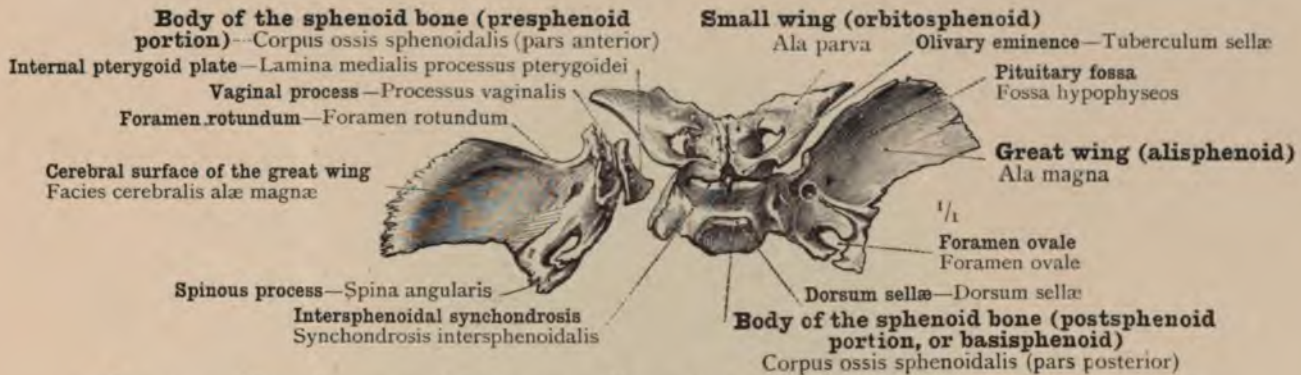


FIG. 123.—THE SPHENOID BONE OF A BOY BORN AT FULL TERM, SEEN FROM ABOVE.
Body-length, 19 inches.

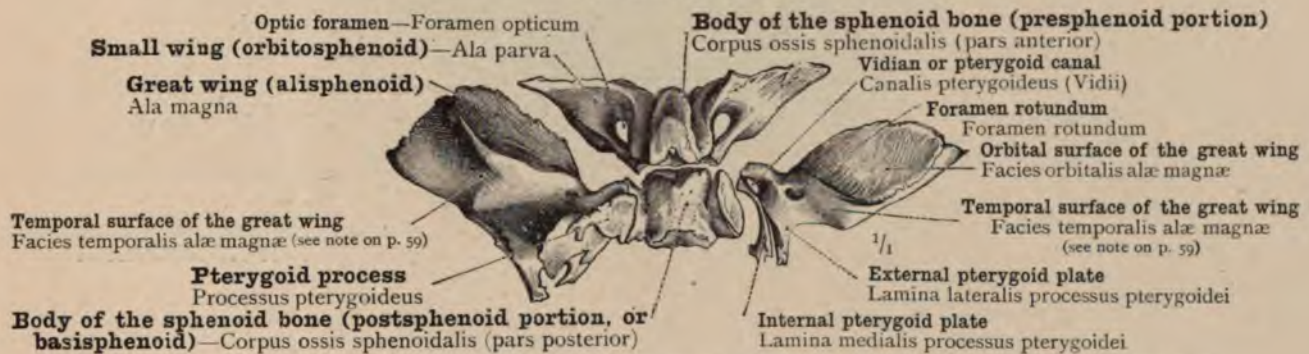


FIG. 124.—THE SPHENOID BONE OF A BOY BORN AT FULL TERM, SEEN FROM BELOW.
Body-length, 19 inches.

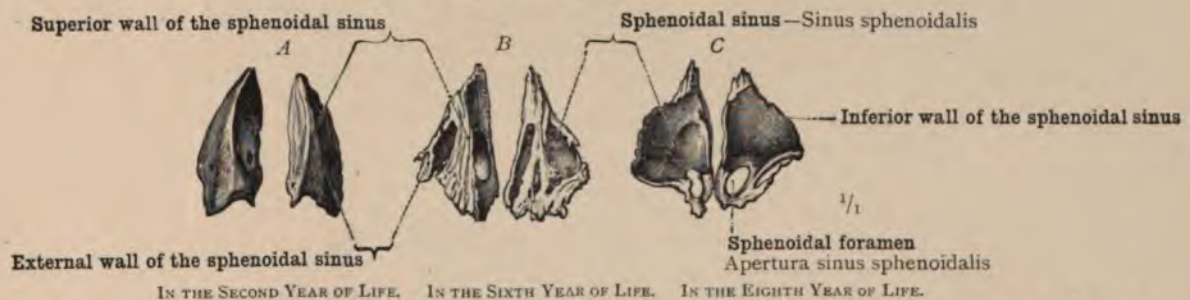


FIG. 125.—CONCHÆ SPHENOIDALES—THE SPHENOIDAL TURBinate BONES. SEEN FROM ABOVE.

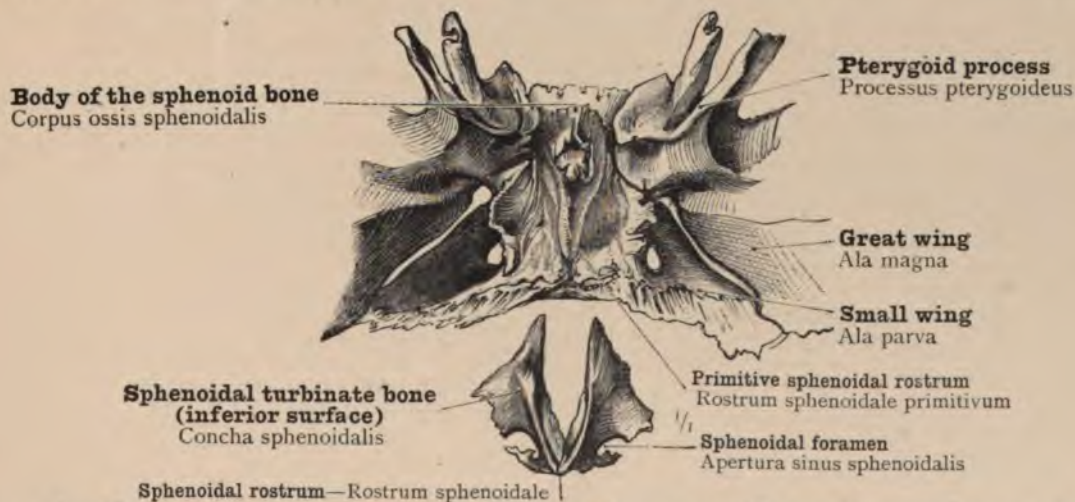
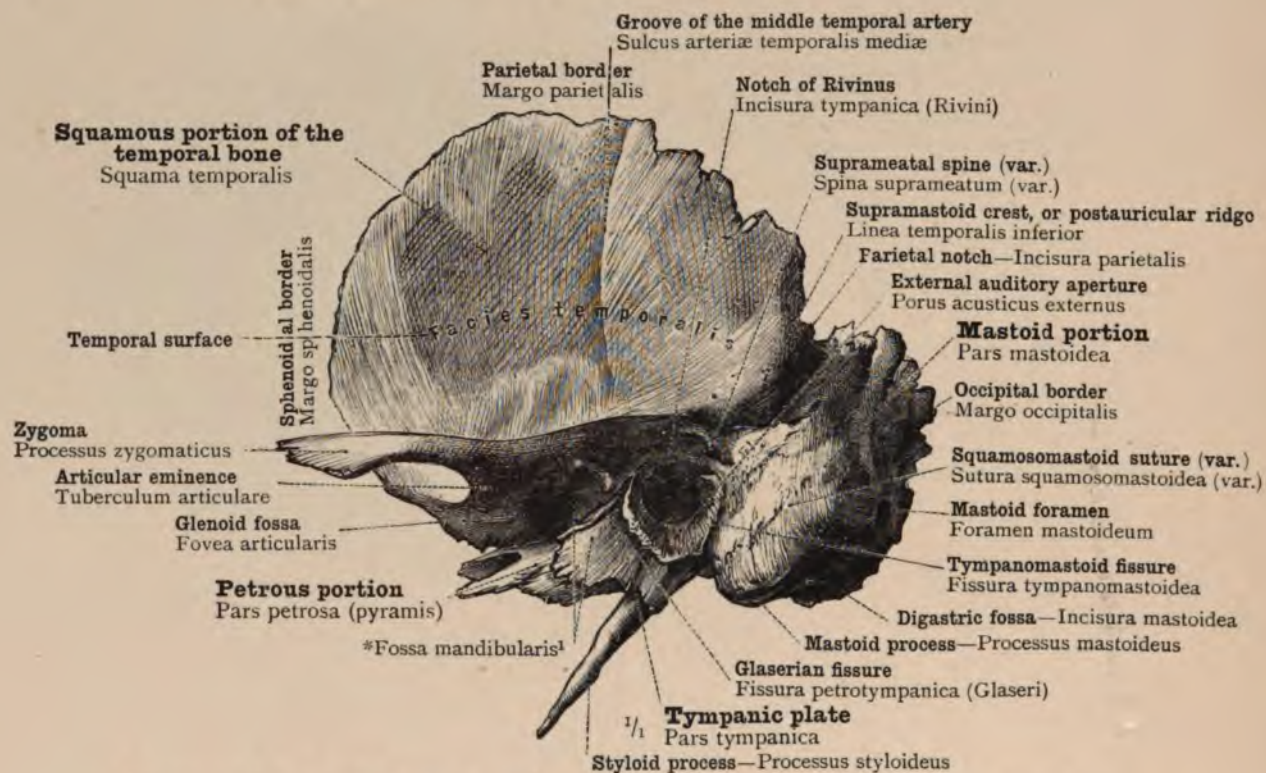


FIG. 126.—THE RELATION OF THE SPHENOIDAL TURBinate BONES TO THE INFERIOR SURFACE OF THE SPHENOID BONE IN THE SIXTH YEAR OF LIFE.

Development of the Sphenoid Bone.



¹ What is called the mandibular fossa by Toldt is the posterior non-articular portion of the glenoid fossa (separated from the articular portion by the Glaserian fissure). Its floor is formed by the tympanic plate, and it lodges a portion of the parotid gland.—Tr.

FIG. 127.—THE LEFT TEMPORAL BONE SEEN FROM THE OUTER SIDE (TEMPORAL SURFACE).

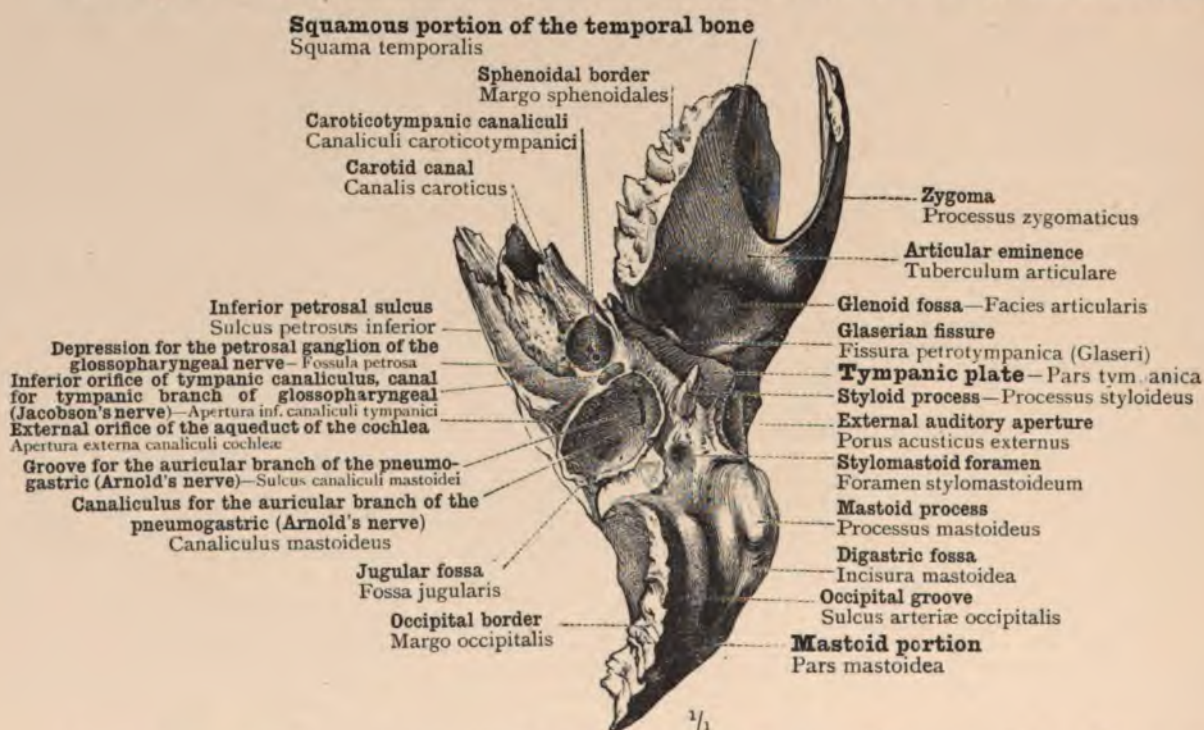


FIG. 128.—THE LEFT TEMPORAL BONE SEEN FROM BELOW (EXTERNAL BASAL SURFACE).

Os temporale—The temporal bone.

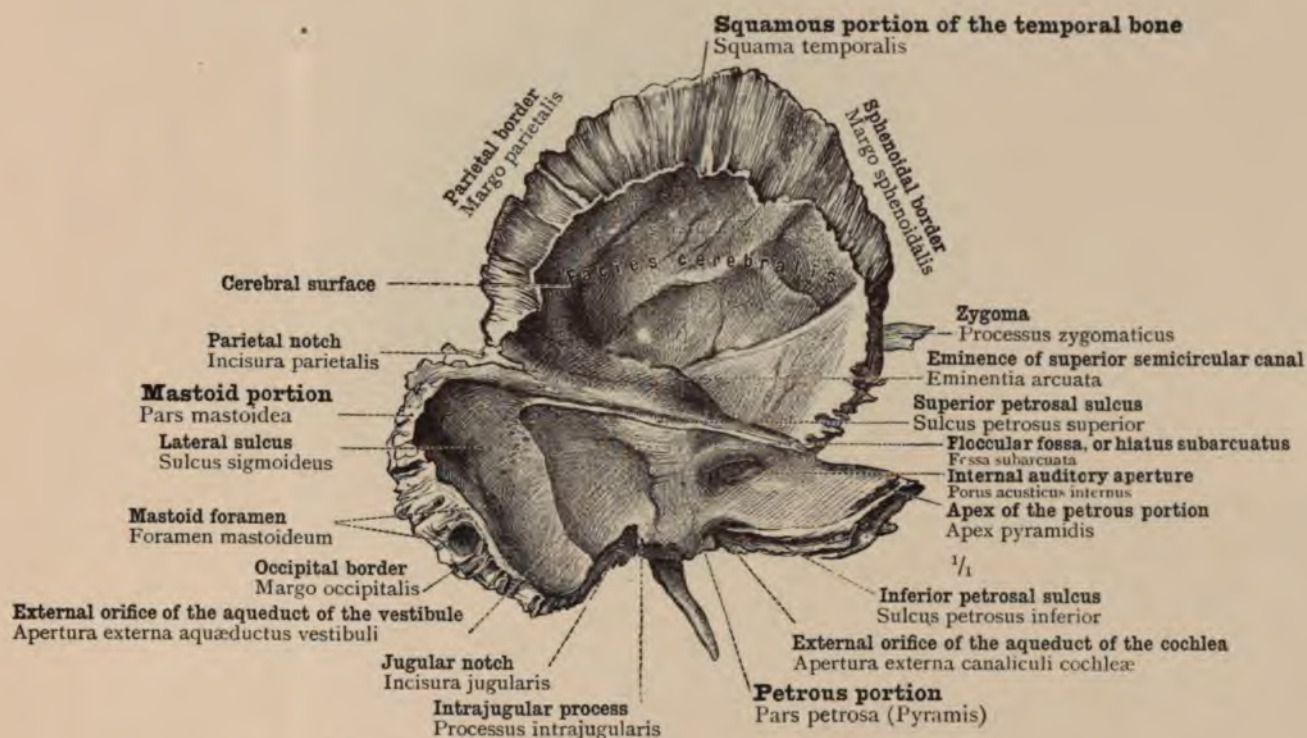


FIG. 129.—THE LEFT TEMPORAL BONE SEEN FROM WITHIN (CEREBRAL SURFACE).

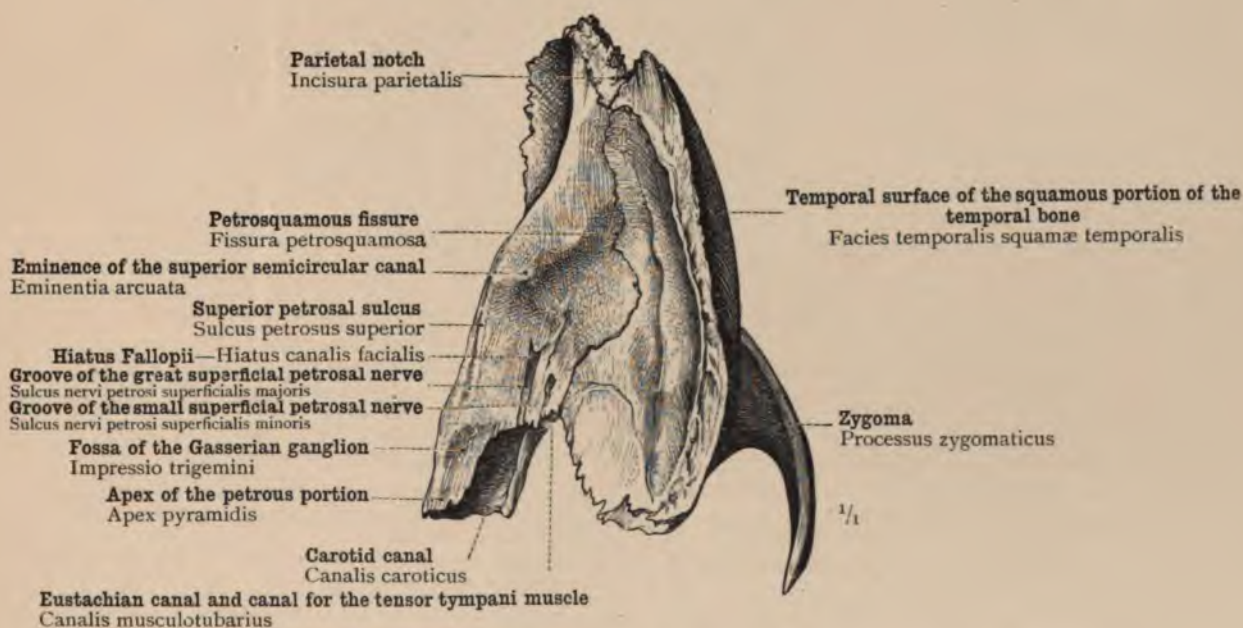


FIG. 130.—THE LEFT TEMPORAL BONE SEEN FROM ABOVE (INTERNAL BASAL SURFACE).

Os temporale—The temporal bone

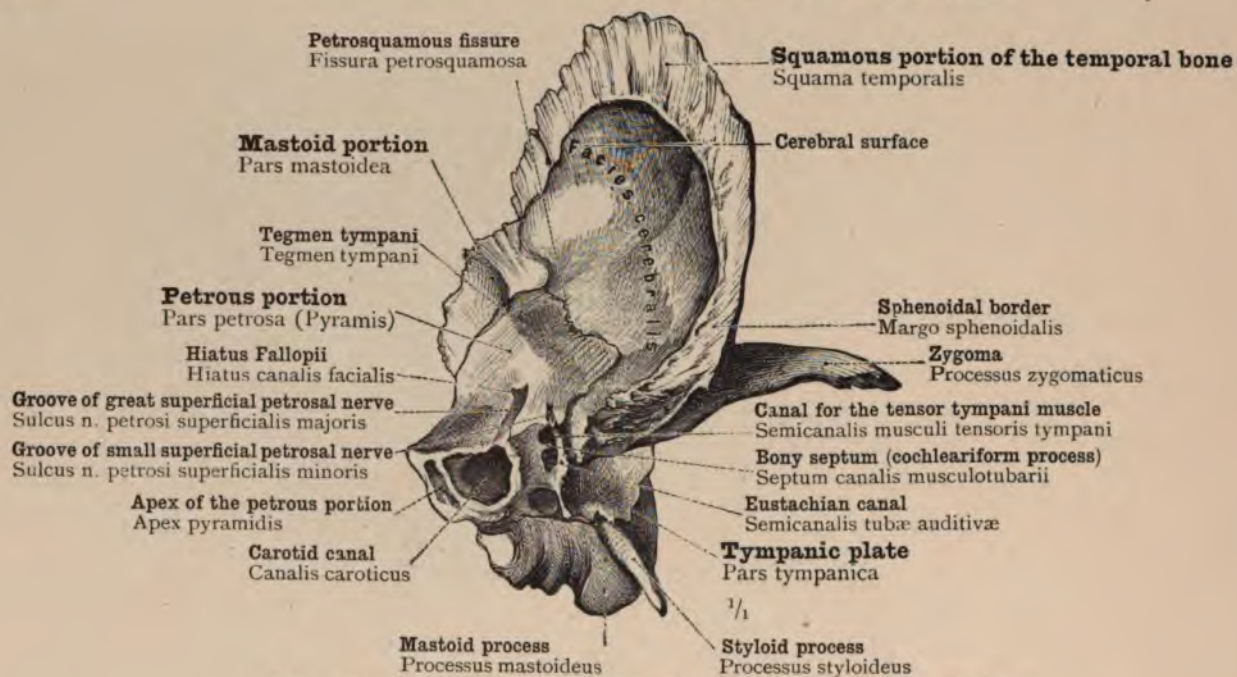


FIG. 131.—THE LEFT TEMPORAL BONE SEEN FROM BEFORE.

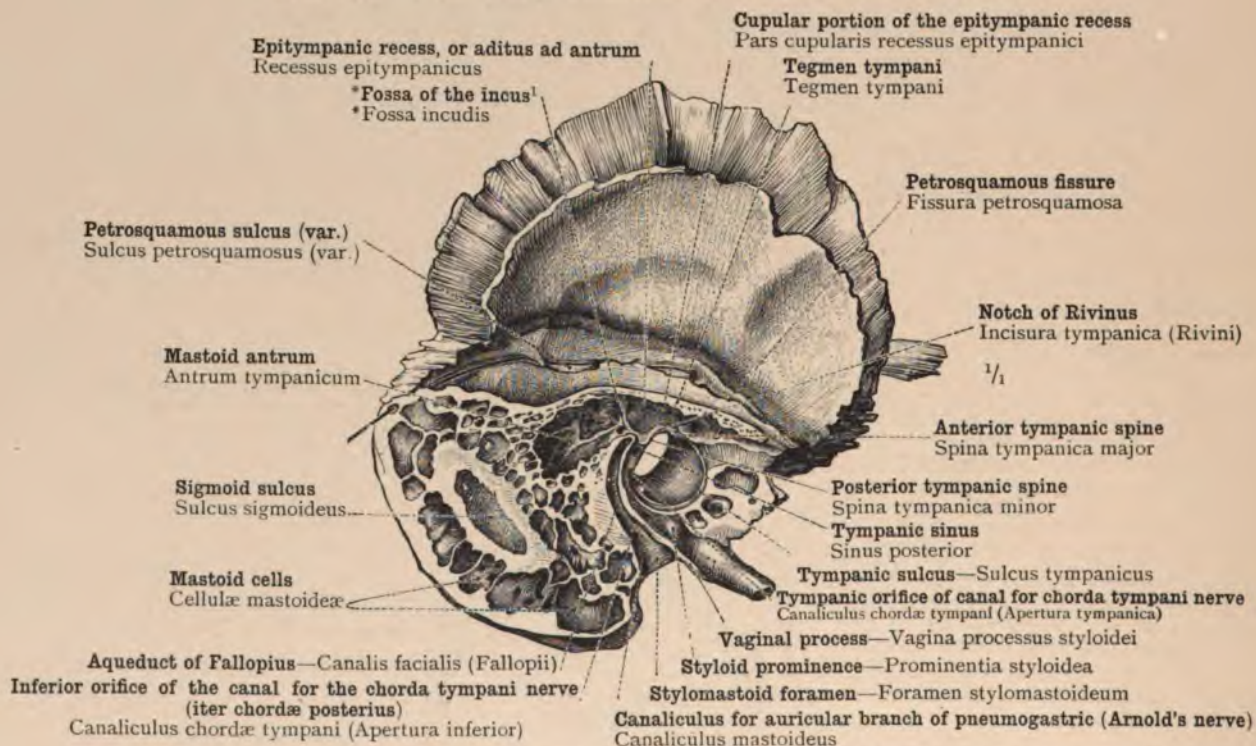


FIG. 132.—THE EXTERNAL WALL OF THE TYMPANUM AND THE MASTOID CELLS DISPLAYED BY A SECTION THROUGH THE LEFT TEMPORAL BONE IN A PLANE PARALLEL WITH THE SQUAMOUS PORTION OF THAT BONE.

Os temporale—The temporal bone.

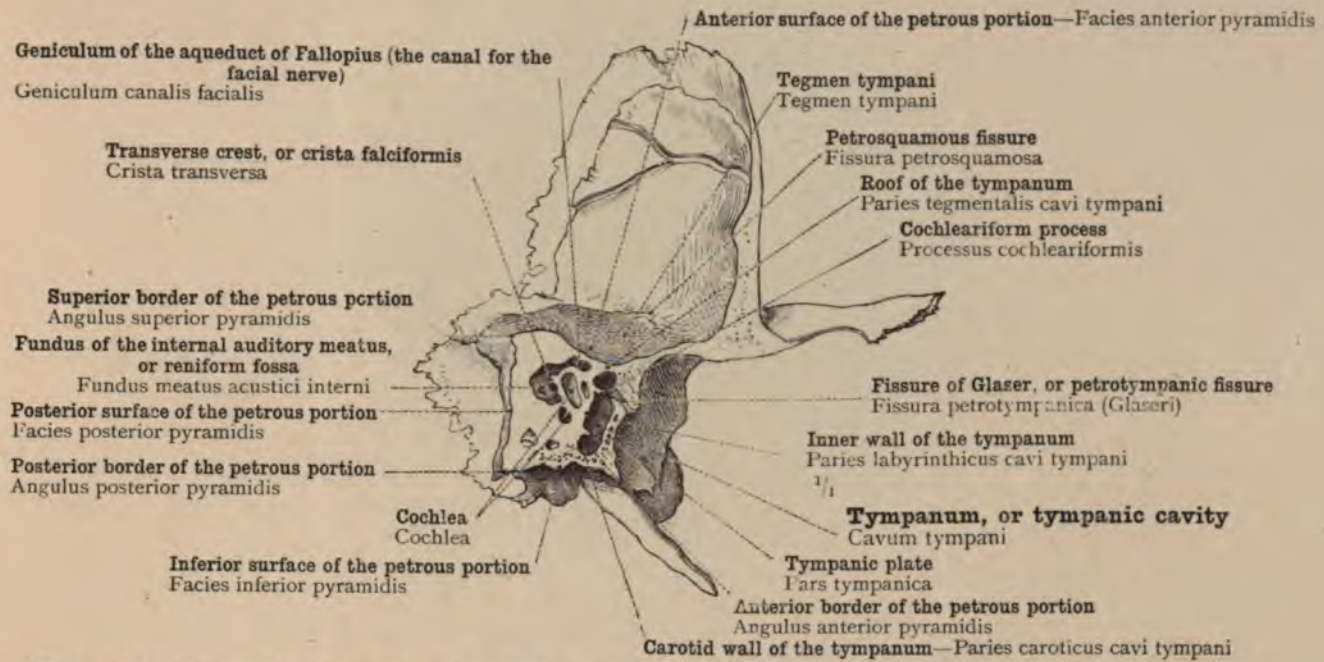
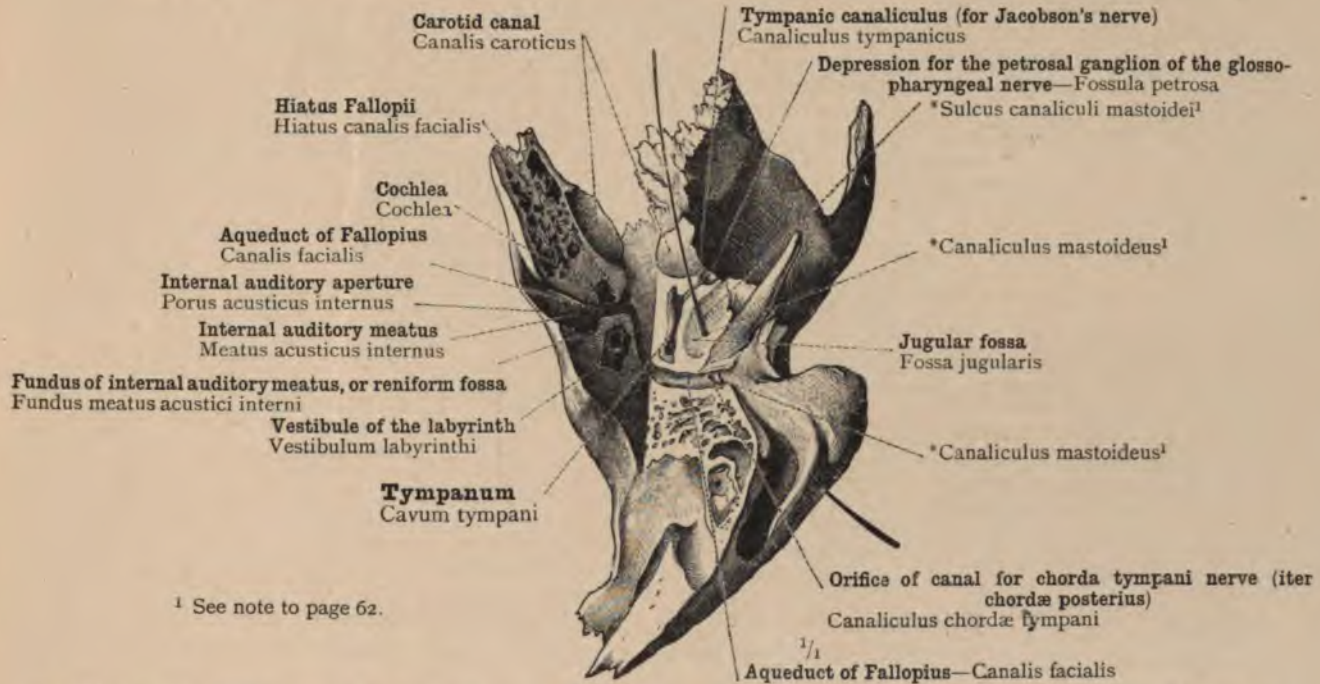


FIG. 133.—VERTICAL SECTION THROUGH THE PETROUS PORTION OF THE LEFT TEMPORAL BONE AND THROUGH THE ANTERIOR PART OF THE SQUAMOUS PORTION. (NOMENCLATURE OF THE SURFACE AND BORDERS OF THE PETROUS PORTION.)



¹ See note to page 62.

FIG. 134.—AQUEDUCTUS FALLOPII, OR CANAL FOR THE FACIAL NERVE, SHOWN FROM BENEATH BY THE REMOVAL OF A WEDGE-SHAPED PIECE FROM THE PETROUS PORTION OF THE LEFT TEMPORAL BONE.

The canaliculus tympanicus, for the tympanic branch of the glossopharyngeal nerve (Jacobson's nerve), is also opened up throughout its whole length.

Os temporale—Temporal bone.

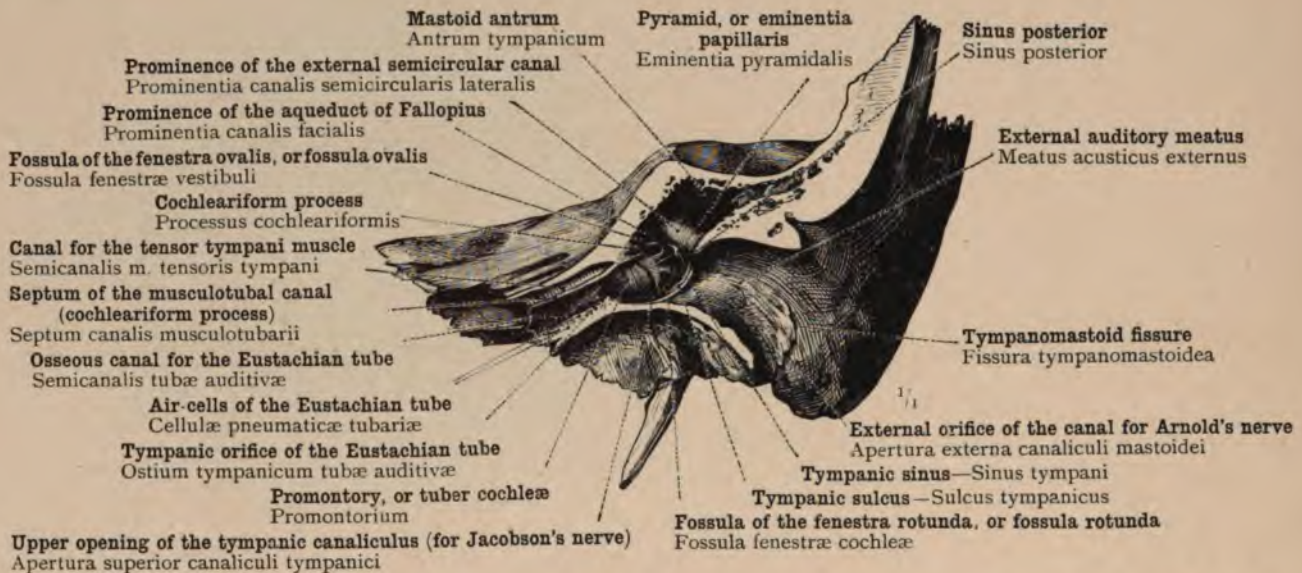


FIG. 135.—VERTICAL SECTION THROUGH THE LEFT TEMPORAL BONE IN A PLANE PARALLEL WITH THE SUPERIOR BORDER OF THE PETROUS PORTION, AND PASSING THROUGH THE MIDDLE OF THE EXTERNAL AUDITORY MEATUS, TO DEMONSTRATE THE TYMPANIC CAVITY, CAVUM TYMPANI, AND THE ADJOINING PARTS.

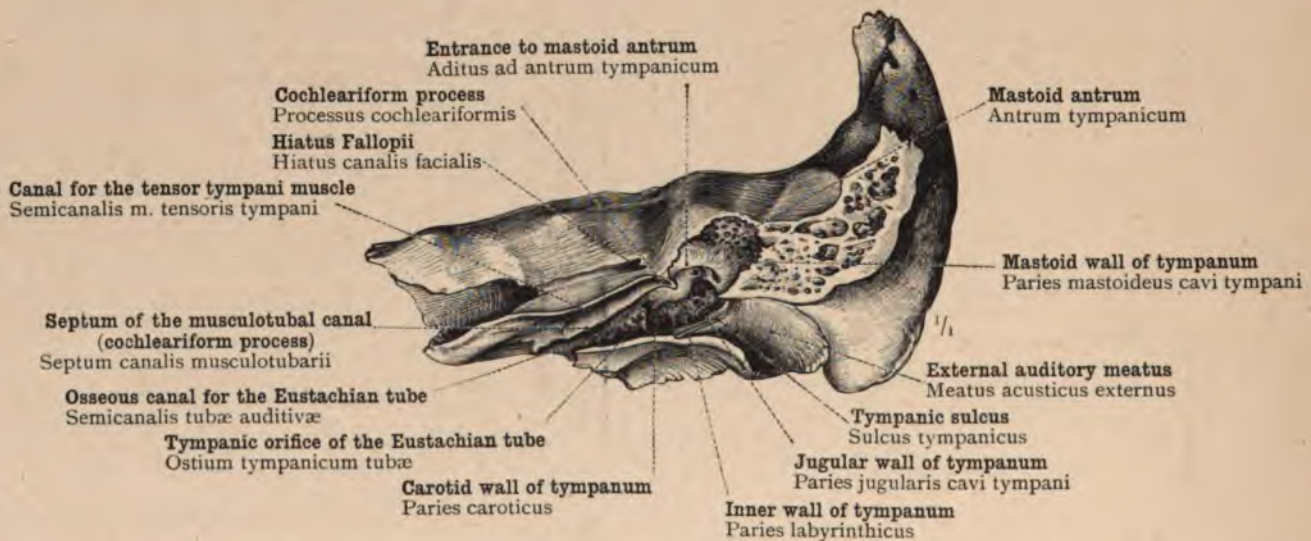


FIG. 136. VERTICAL SECTION THROUGH THE LEFT TEMPORAL BONE IN A PLANE PARALLEL WITH THE SUPERIOR BORDER OF THE PETROUS PORTION, THE SECTION PASSING ALONG THE POSTERIOR WALL OF THE EXTERNAL AUDITORY MEATUS, TO DEMONSTRATE THE TYMPANIC CAVITY, CAVUM TYMPANI, AND THE ADJOINING PARTS.

Os temporale—Temporal bone.

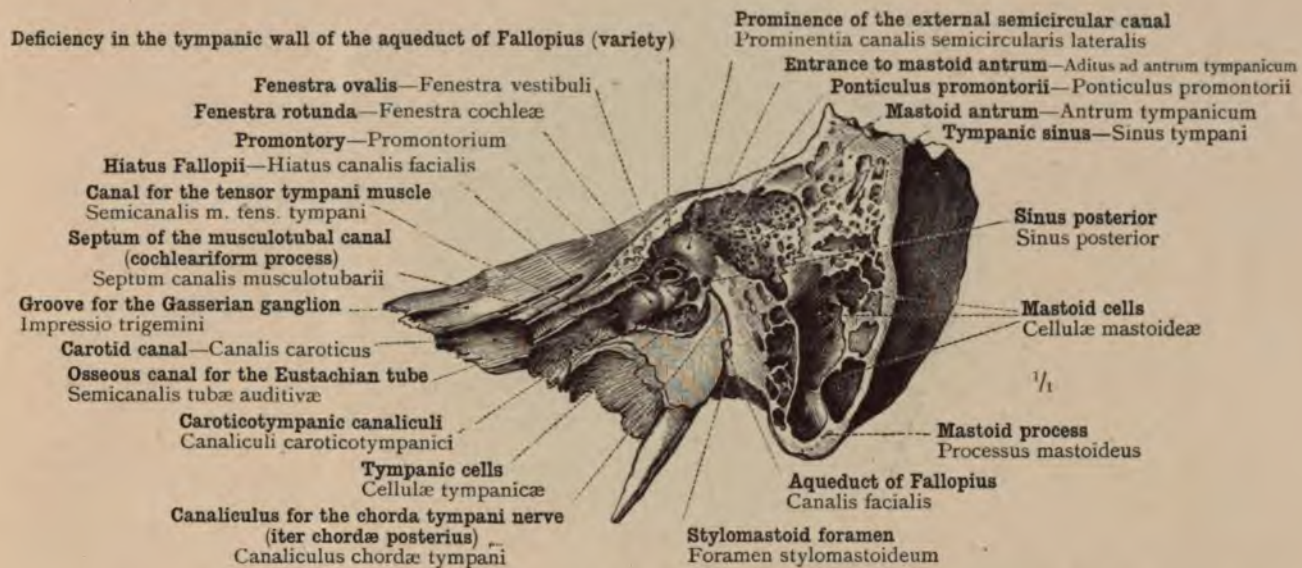


FIG. 137.—VERTICAL SECTION THROUGH THE LEFT TEMPORAL BONE, CROSSING OBLIQUELY THE SUPERIOR BORDER OF THE PETROUS PORTION, AND PASSING THROUGH THE ANTERIOR PORTION OF THE MASTOID PROCESS, TO DEMONSTRATE THE TYMPANIC CAVITY, CAVUM TYMPANI, AND THE ADJOINING PARTS.

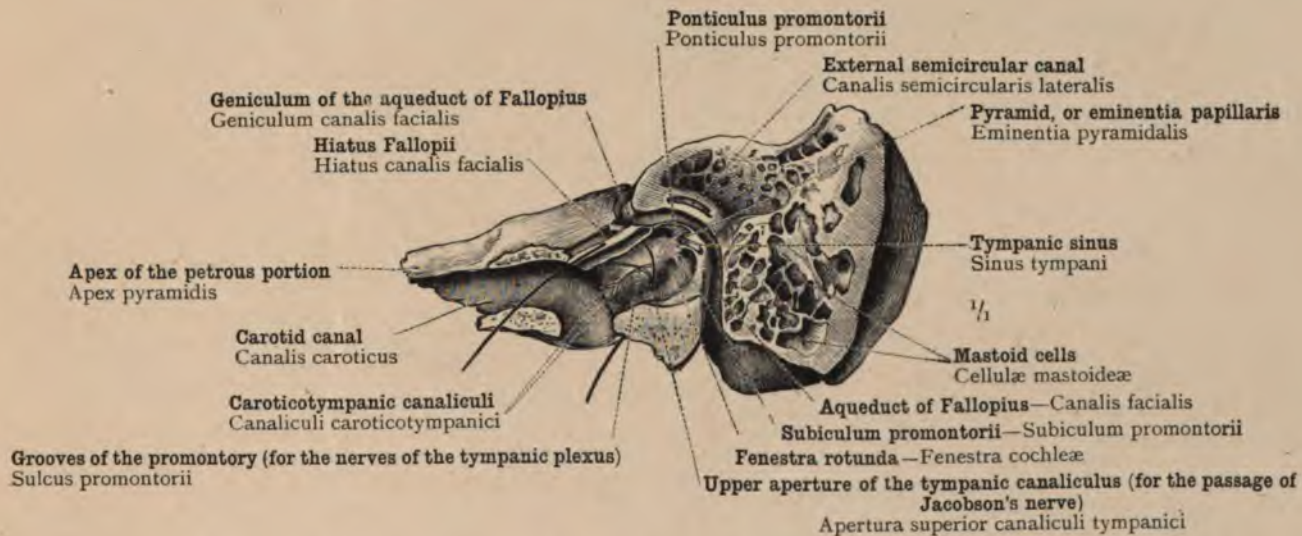


FIG. 138.—VERTICAL SECTION THROUGH THE LEFT TEMPORAL BONE, CROSSING OBLIQUELY THE SUPERIOR BORDER OF THE PETROUS PORTION, AND PASSING THROUGH THE POSTERIOR PORTION OF THE MASTOID PROCESS, TO DEMONSTRATE THE TYMPANIC CAVITY, CAVUM TYMPANI, AND THE ADJOINING PARTS.

A bristle has been passed through the canaliculus tympanicus (the canal for Jacobson's nerve—the tympanic branch of the glossopharyngeal nerve) into the tympanum, and, after traversing this cavity, leaves it by the canaliculus that opens into the groove for the small superficial petrosal nerve.

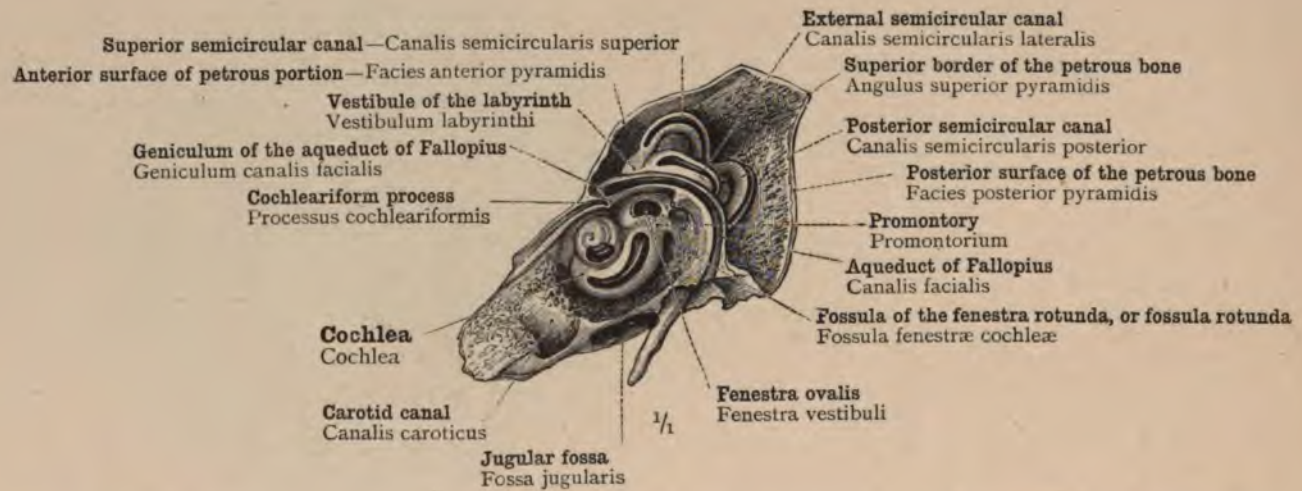
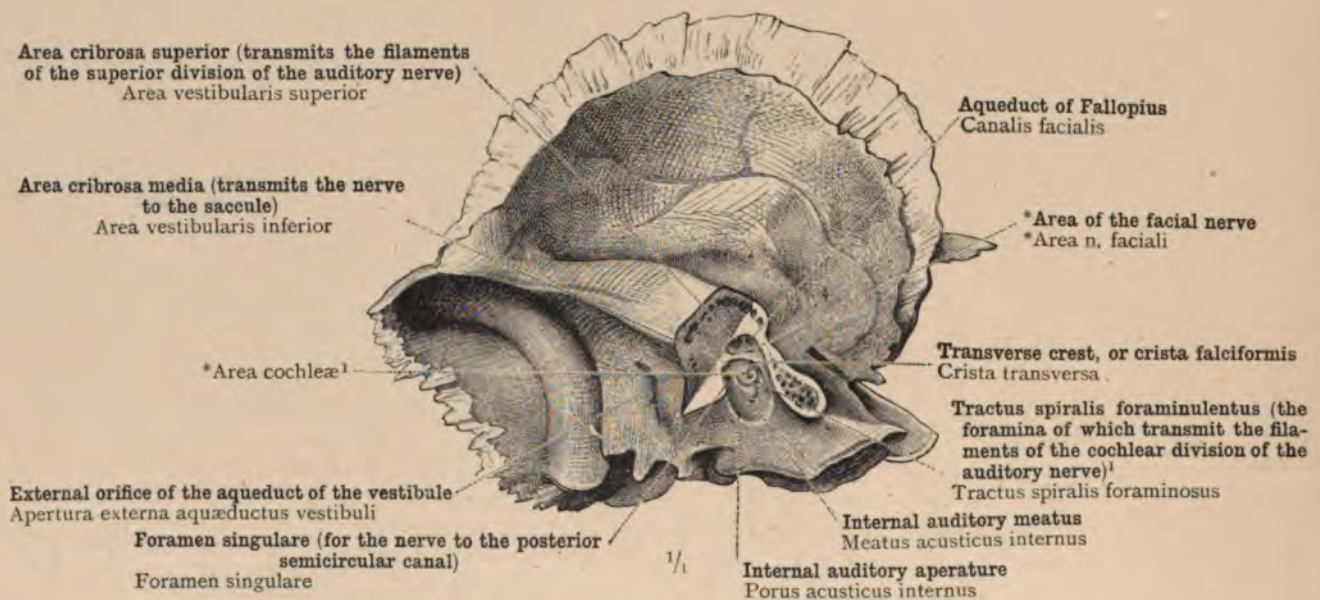


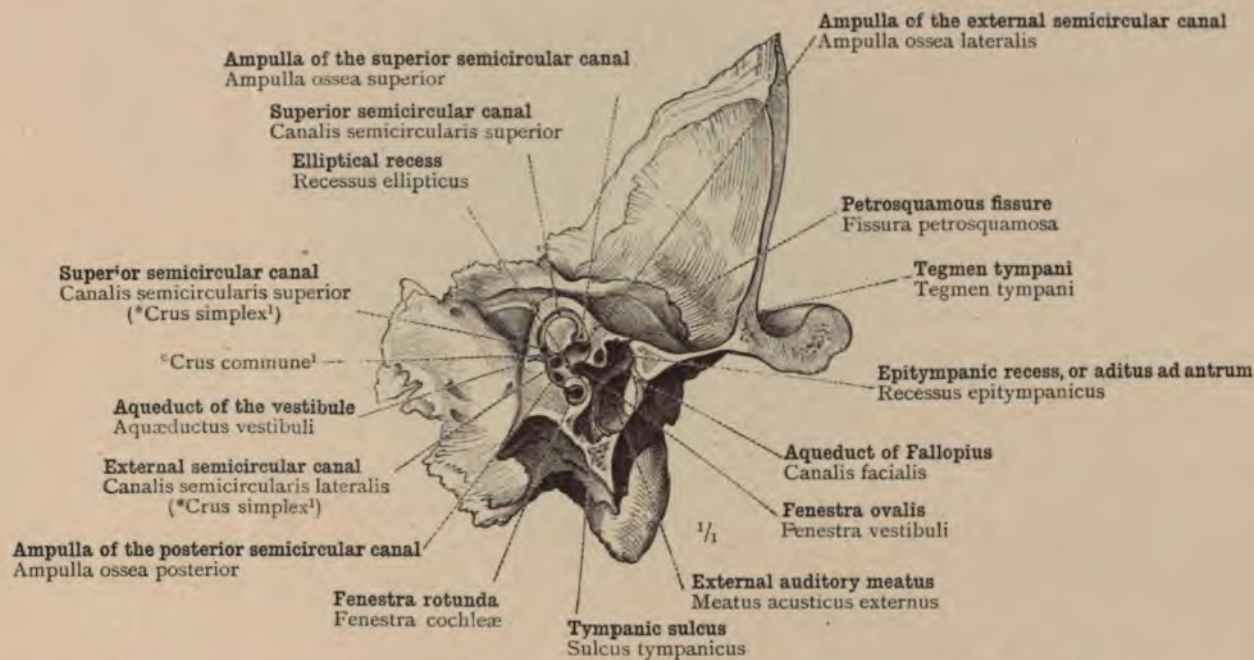
FIG. 139.—THE BONY LABYRINTH, LABYRINTHUS OSSEUS, SHOWN IN THE LEFT PETROUS PORTION. SEEN OBLIQUELY FROM IN FRONT AND BELOW.



¹ The helicoid depression of the tractus spiralis foraminulentus corresponds with the base of the cochlea, and at the centre of the helix is the foramen centrale cochleæ, the orifice of the central canal of the modiolus.—Tr.

FIG. 140.—THE INTERNAL AUDITORY MEATUS, MEATUS ACUSTICUS INTERNUS, EXPOSED FROM ABOVE BY THE REMOVAL OF A RIGHT-ANGLED WEDGE FROM THE PETROUS PORTION OF THE LEFT TEMPORAL BONE. SEEN FROM BEHIND AND ABOVE.

Os temporale—Temporal bone.



¹ The superior and the posterior semicircular canals unite at their non-ampullary or undilated extremities into a common canal before opening into the vestibule. For this reason the separate undilated portion of the three semicircular canals is, by Continental anatomists, termed *crus simplex*, and the common undilated extremity of the superior and posterior canals *crus commune*.—Tr.

FIG. 141.—PORTIONS OF THE OSSEOUS LABYRINTH AND THE TYMPANUM, SHOWN IN THE LEFT TEMPORAL BONE BY A VERTICAL SECTION THROUGH THE PETROUS PORTION IN THE PLANE OF THE SUPERIOR SEMICIRCULAR CANAL. SEEN OBLIQUELY FROM IN FRONT AND WITHIN.

The fenestra ovalis is divided vertically.

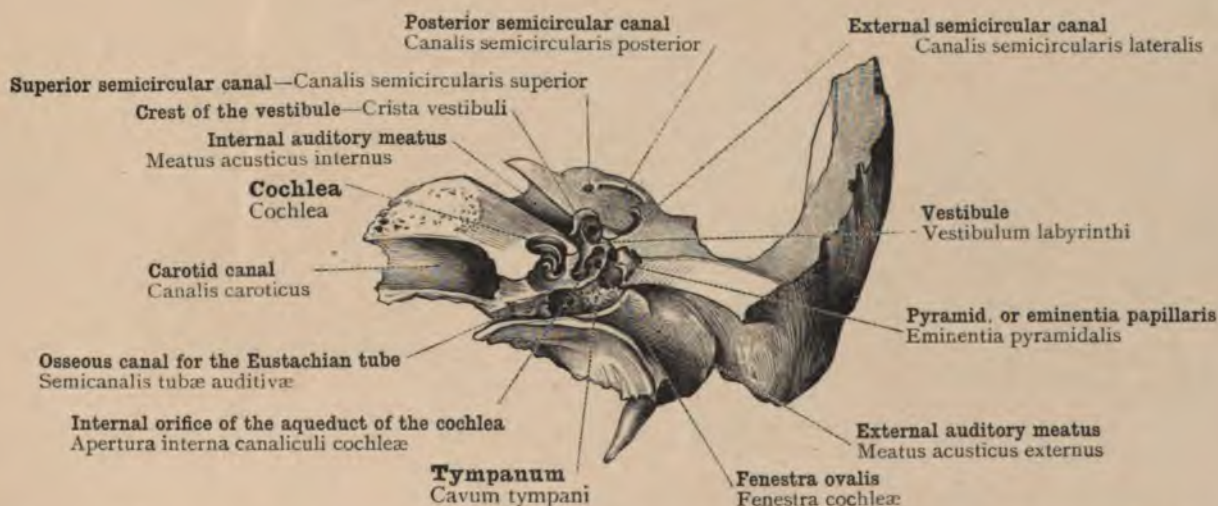


FIG. 142.—PORTIONS OF THE OSSEOUS LABYRINTH AND THE TYMPANUM, SHOWN IN THE LEFT TEMPORAL BONE BY A HORIZONTAL SECTION THROUGH THE PETROUS PORTION ALONG THE INTERNAL AND THE EXTERNAL AUDITORY MEATUS. SEEN FROM ABOVE.

Os temporale—Temporal bone

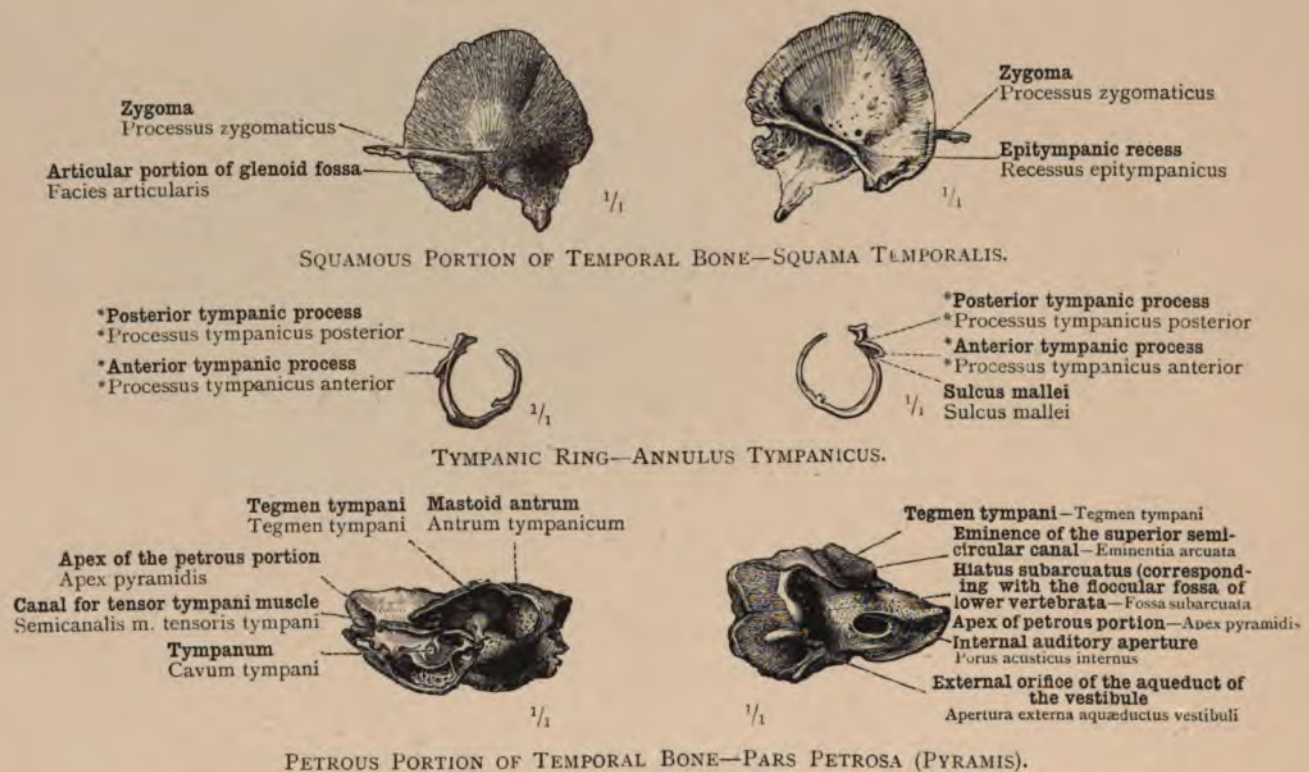


FIG. 143.—SEEN FROM WITHOUT. FIG. 144.—SEEN FROM WITHIN.
THE THREE PARTS OF THE LEFT TEMPORAL BONE FROM AN EIGHT-MONTHS FÆTUS (MONTHS OF FOUR WEEKS EACH).
Body-length, 15½ inches.

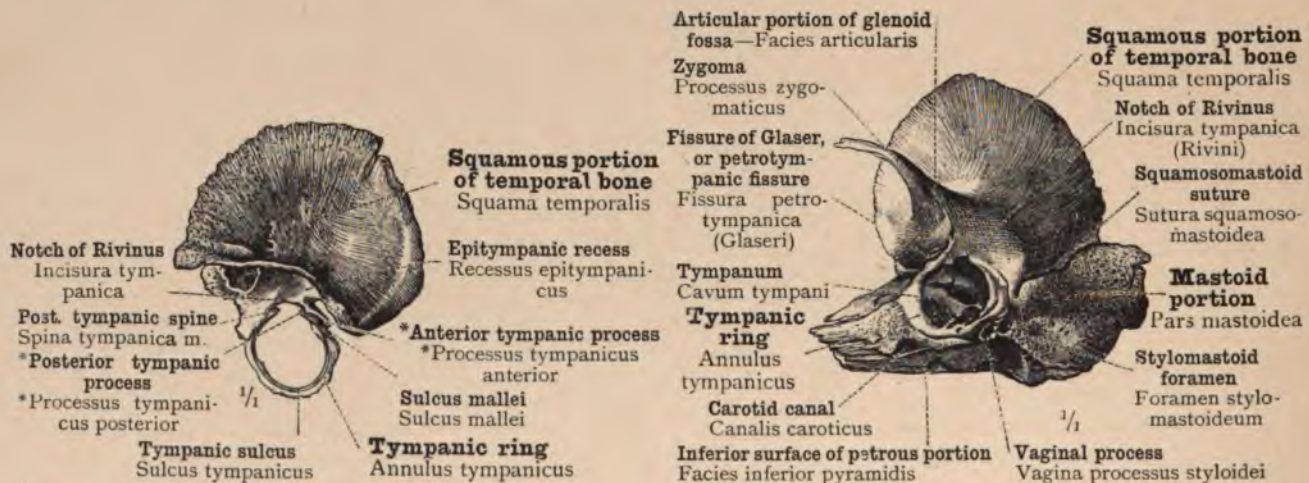


FIG. 145.—THE SQUAMOUS PORTION OF THE TEMPORAL BONE AND THE TYMPANIC RING UNITED. SEEN FROM WITHIN.
From a fœtus at term (body-length, 19 inches).

FIG. 146.—THE THREE PORTIONS OF THE LEFT TEMPORAL BONE UNITED. SEEN FROM WITHOUT AND BELOW.
From a new-born male infant (body-length, 21 inches).

Development of the Temporal Bones.

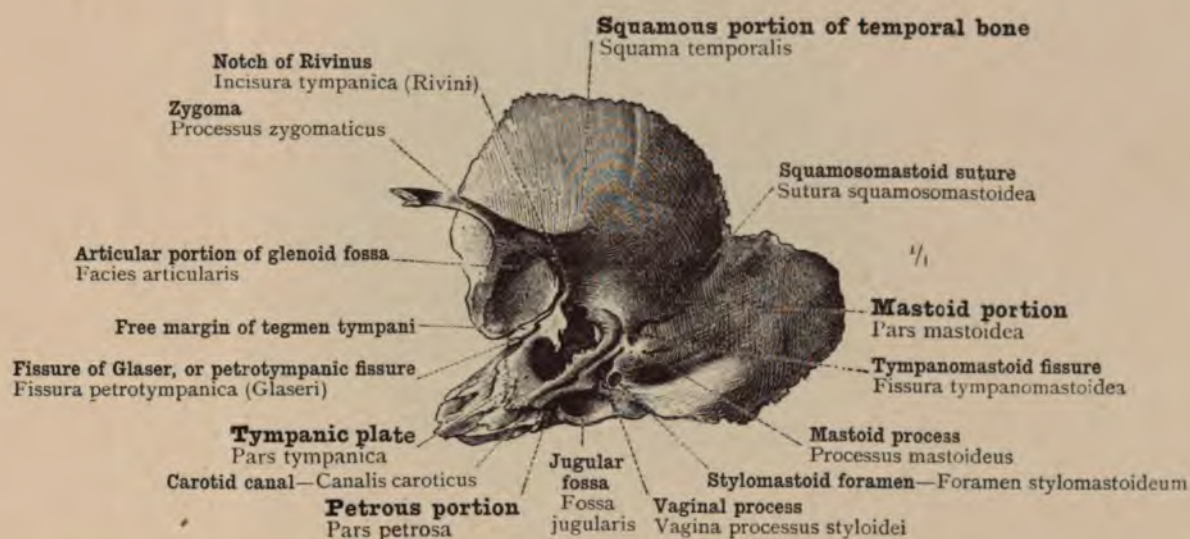


FIG. 147.—THE LEFT TEMPORAL BONE OF A BOY AT THE AGE OF EIGHT YEARS: FORMATION OF THE TYMPANIC PLATE AND OF THE EXTERNAL AUDITORY MEATUS. SEEN OBLIQUELY FROM WITHOUT AND BELOW.

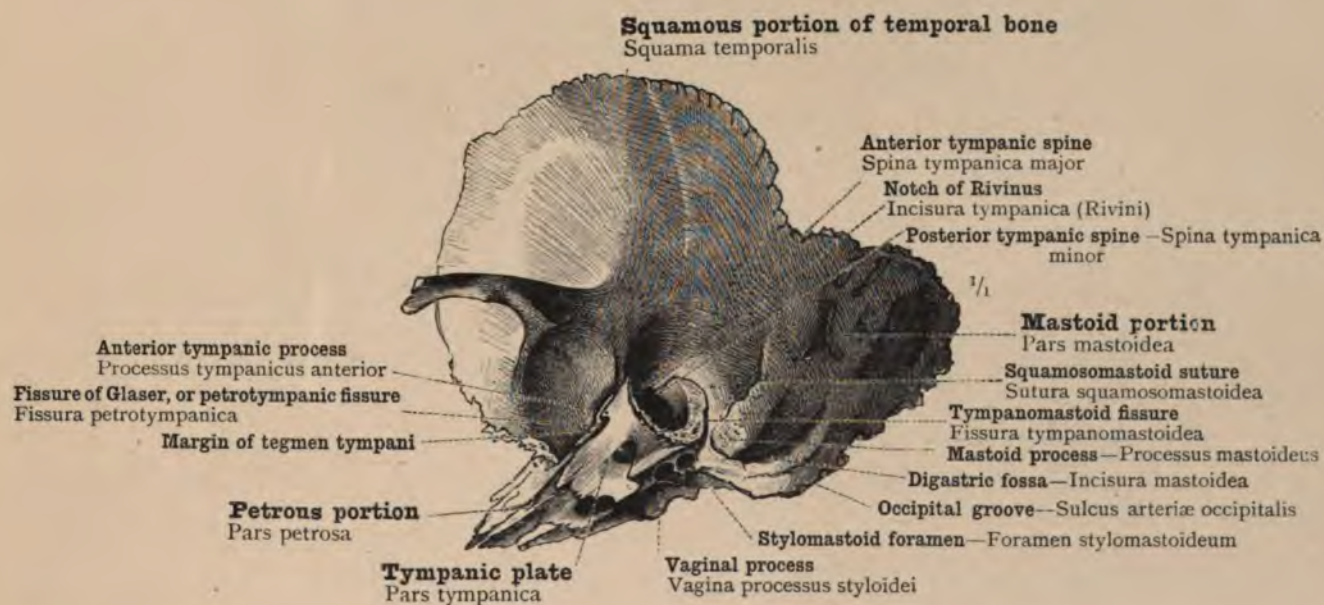


FIG. 148.—THE LEFT TEMPORAL BONE OF A GIRL AT THE AGE OF THREE YEARS: FORMATION OF THE TYMPANIC PLATE AND OF THE EXTERNAL AUDITORY MEATUS. SEEN OBLIQUELY FROM WITHOUT AND BELOW.

Development of the Temporal Bones.

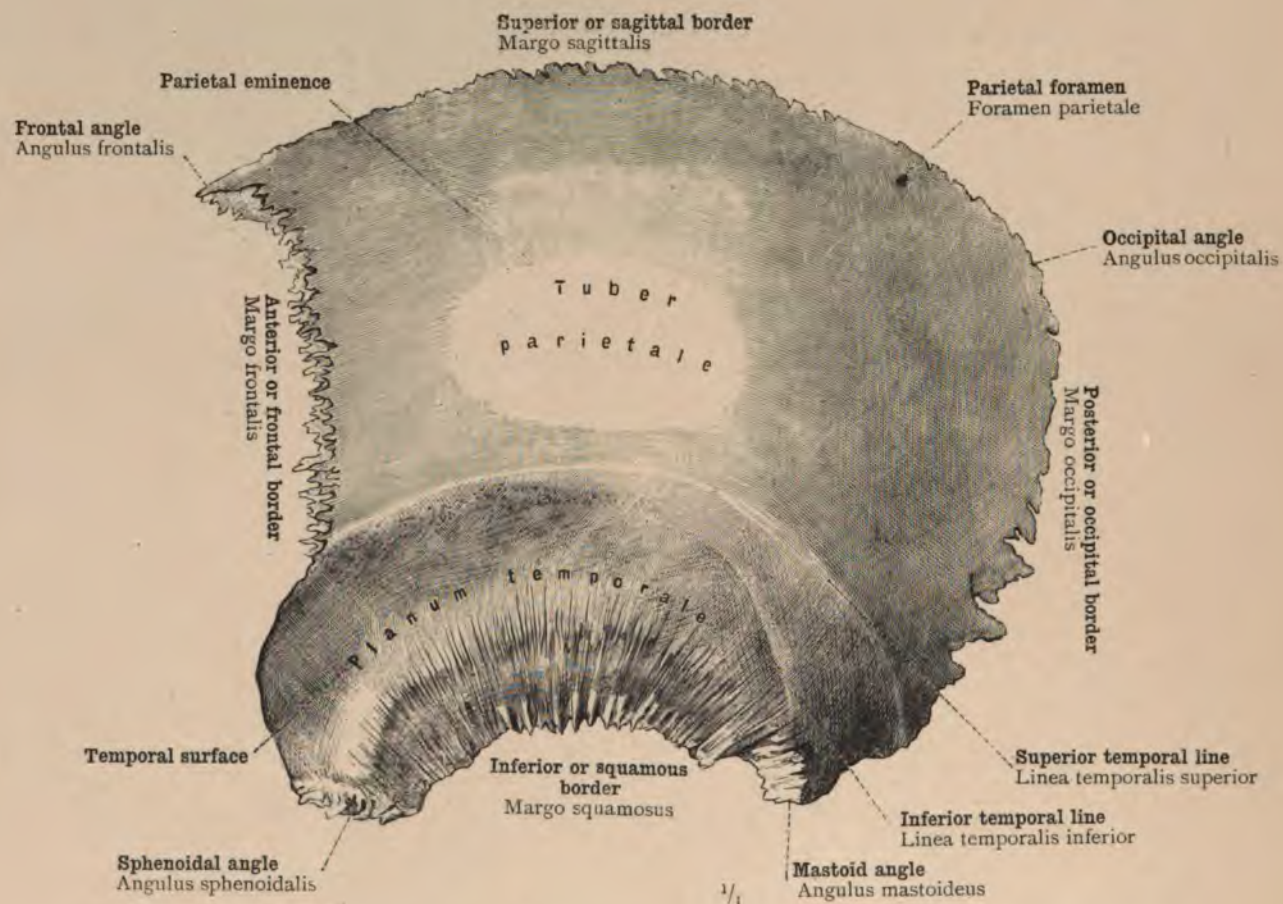


FIG. 149.—THE LEFT PARIETAL BONE SEEN FROM WITHOUT. EXTERNAL SURFACE:
FACIES PARIETALIS.

Os parietale—Parietal bone.

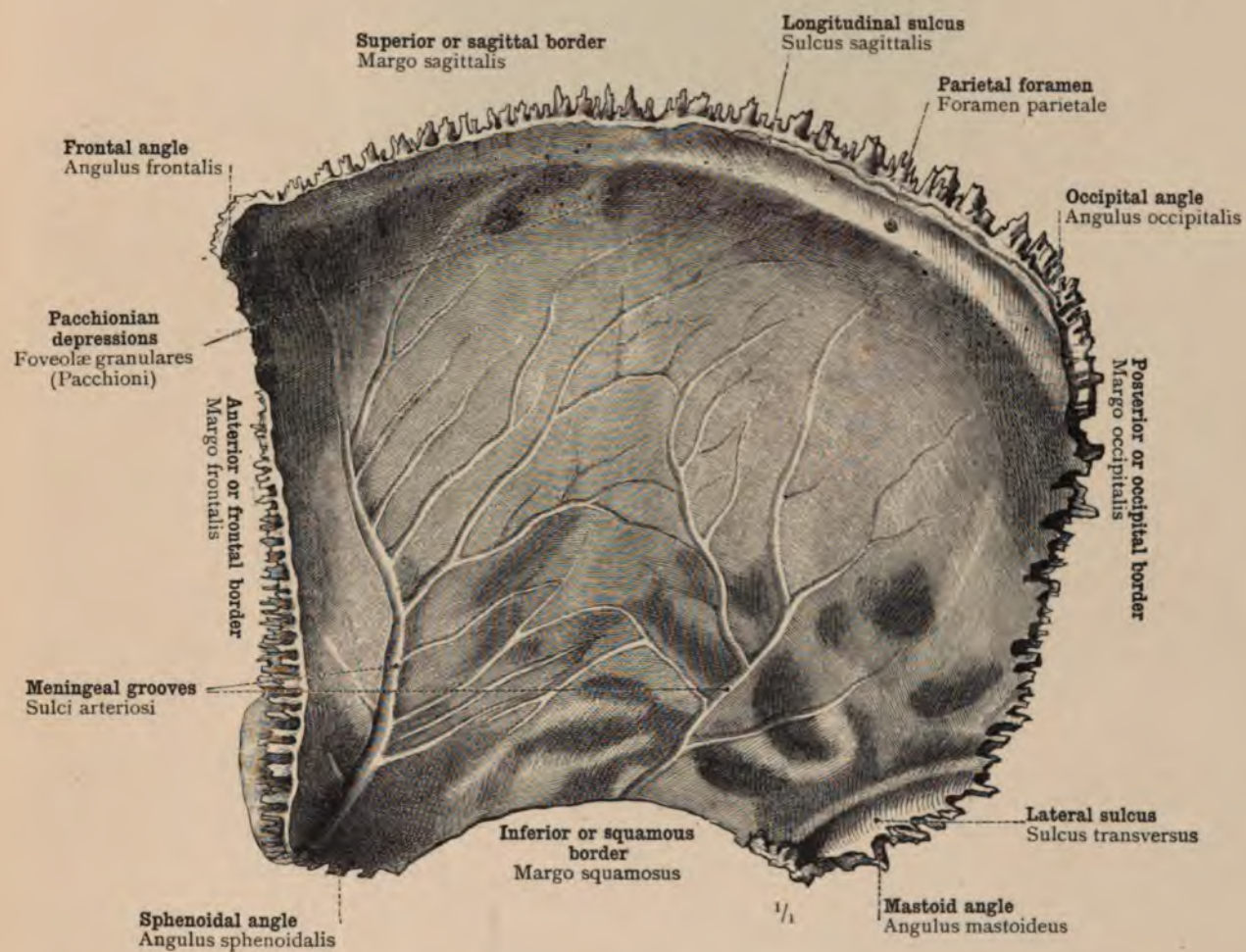


FIG. 150.—THE RIGHT PARIETAL BONE SEEN FROM WITHOUT. INTERNAL SURFACE:
FACIES CEREBRALIS.

Os parietale—Parietal bone.

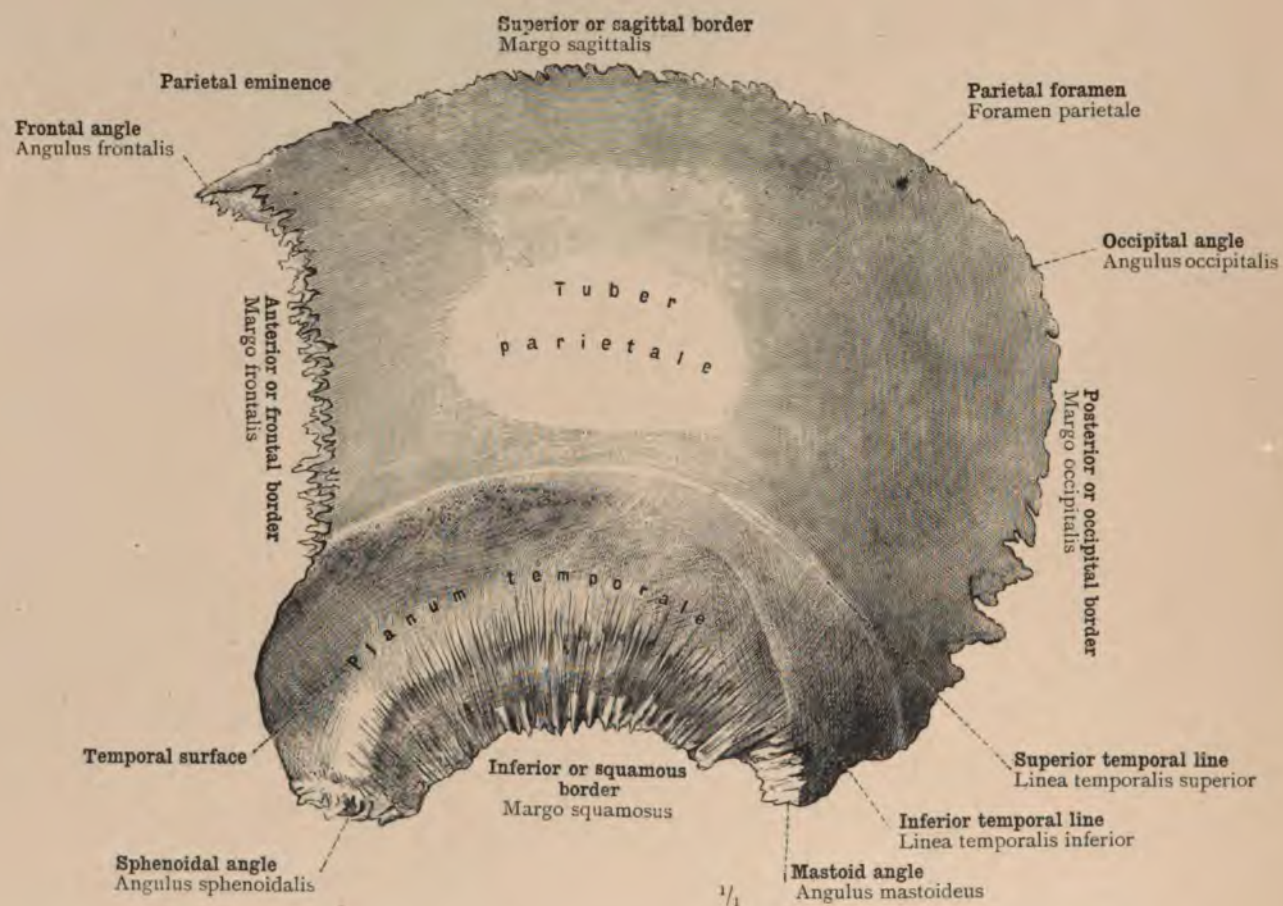


FIG. 149.—THE LEFT PARIETAL BONE SEEN FROM WITHOUT. EXTERNAL SURFACE:
FACIES PARIETALIS.

Os parietale—Parietal bone.

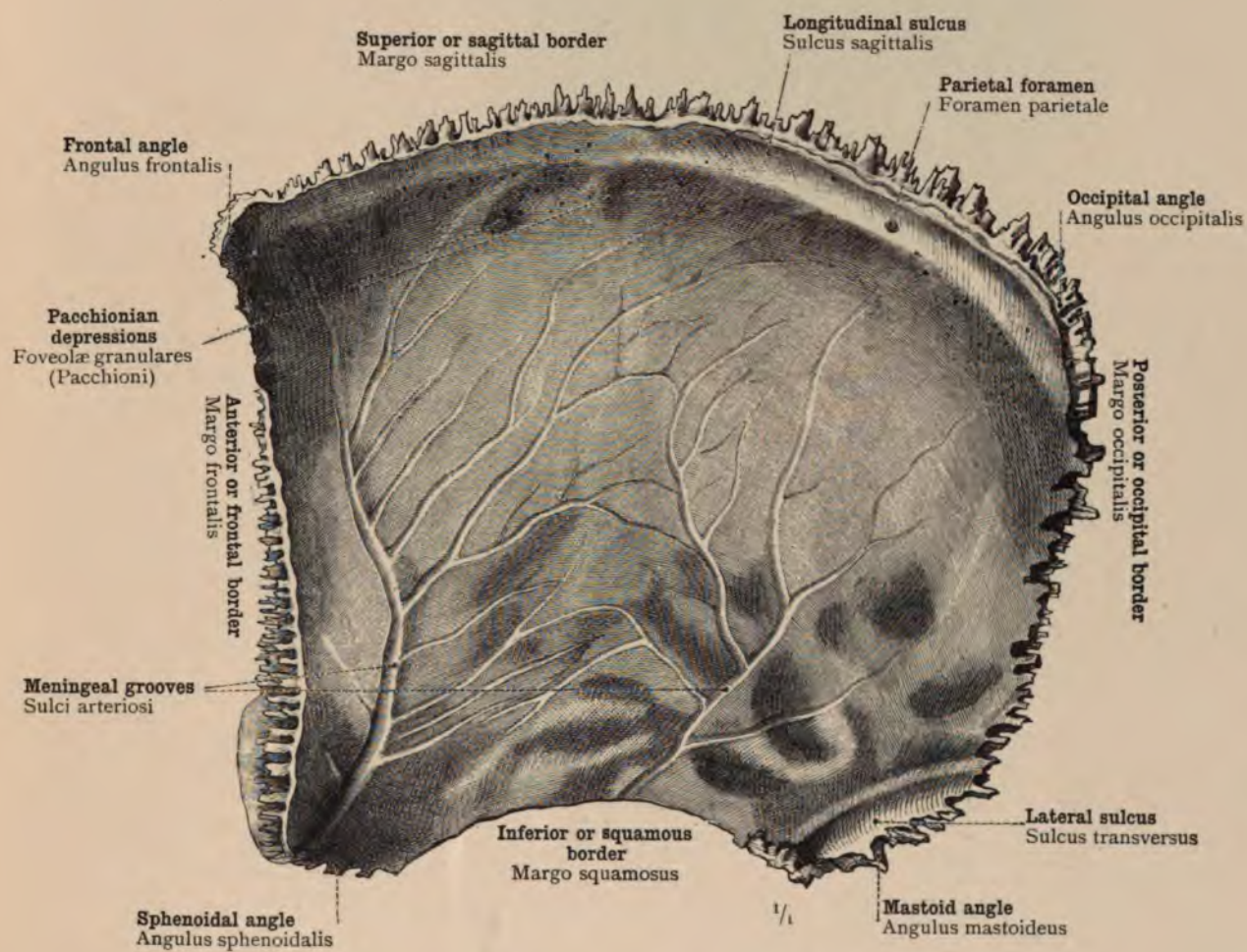


FIG. 150.—THE RIGHT PARIETAL BONE SEEN FROM WITHOUT. INTERNAL SURFACE:
FACIES CEREBRALIS.

Os parietale—Parietal bone.

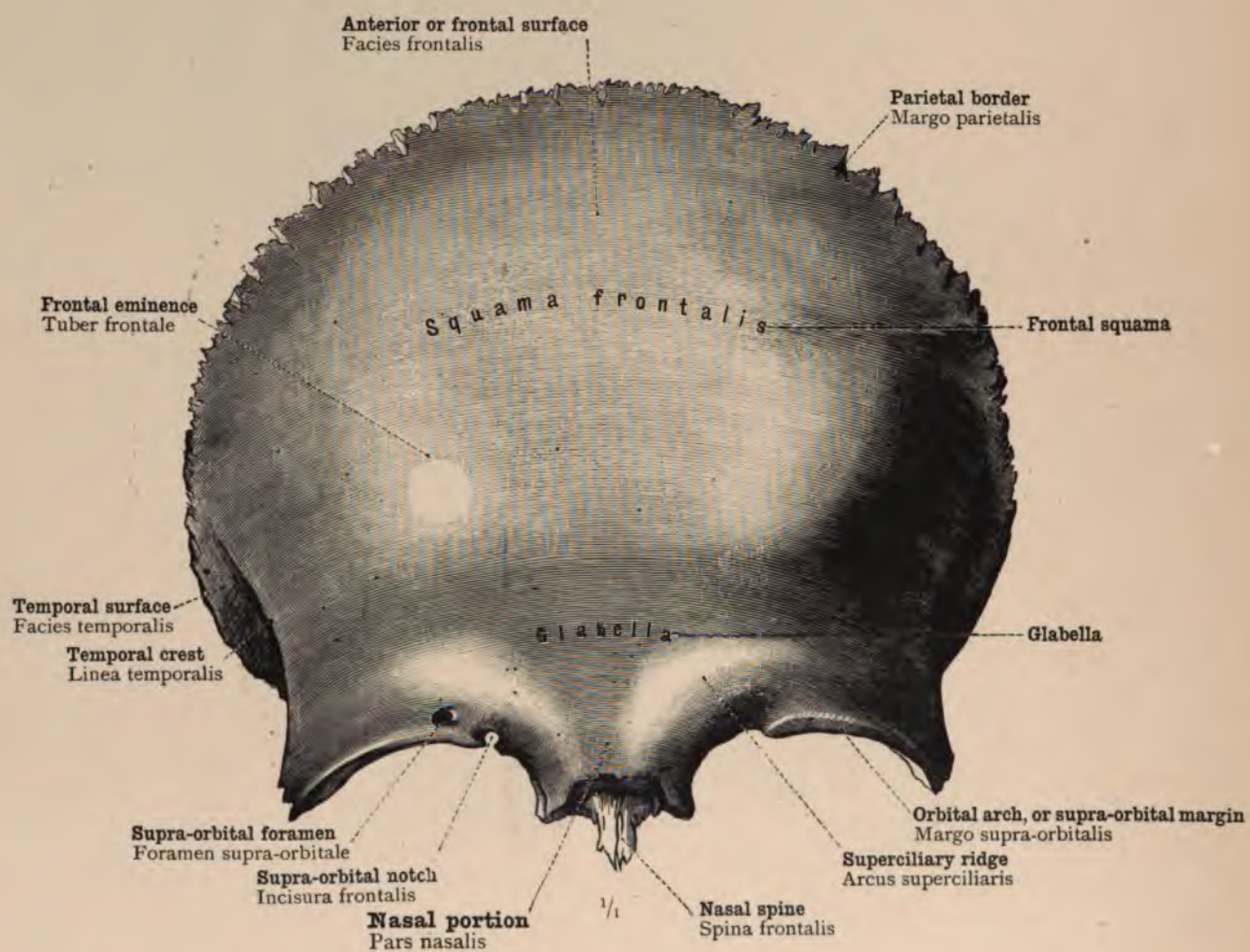
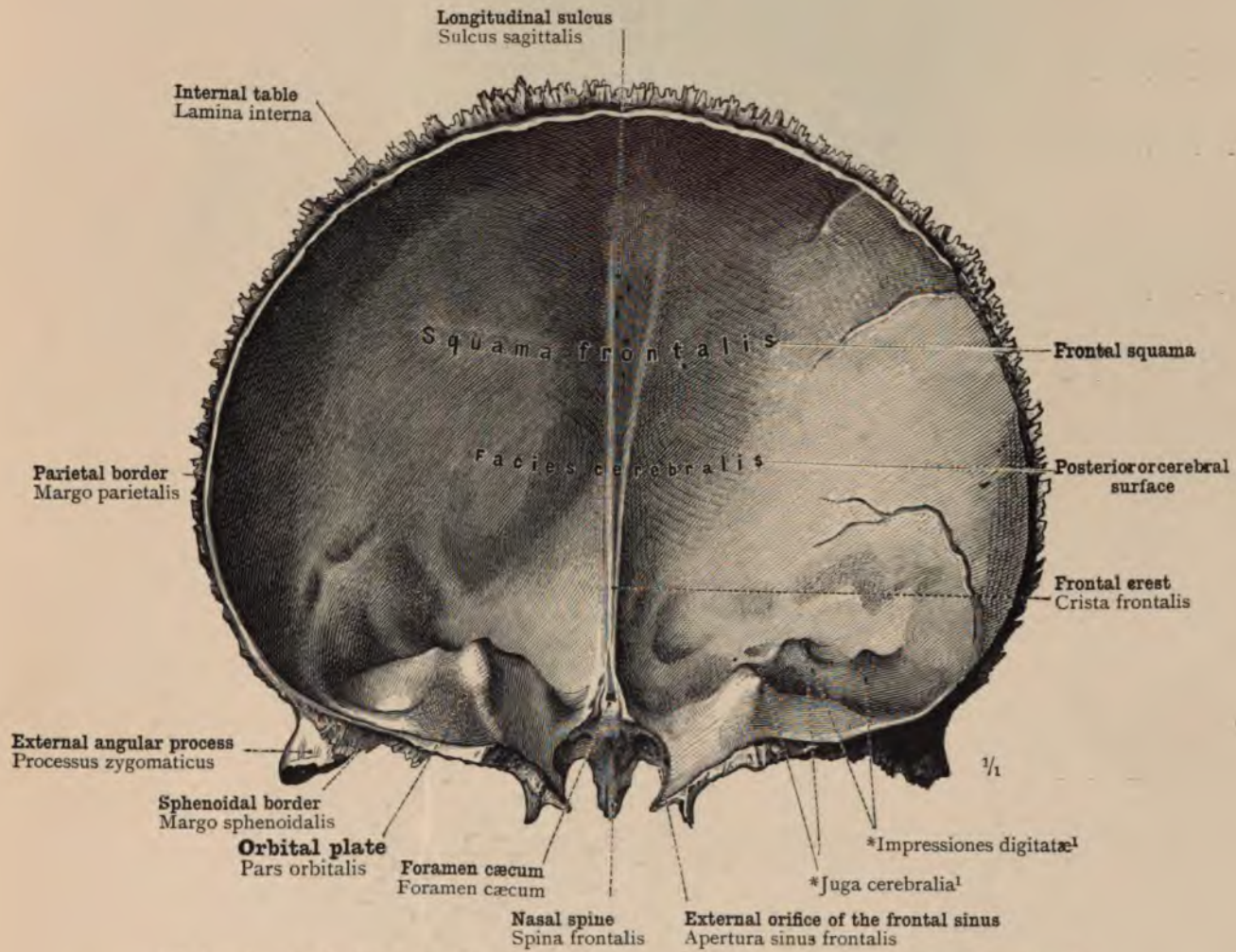


FIG. 151.—THE FRONTAL BONE SEEN FROM BEFORE. EXTERNAL SURFACE: FACIES FRONTALIS.

Os frontale—Frontal bone.



¹ Ridges (juga cerebralia) and sulci (impressiones digitatæ) corresponding respectively to the sulci and convolutions of the superjacent portion of the frontal lobes of the cerebrum.—Tr.

FIG. 152.—THE FRONTAL BONE SEEN FROM BEHIND. INTERNAL SURFACE: FACIES CEREBRALIS.

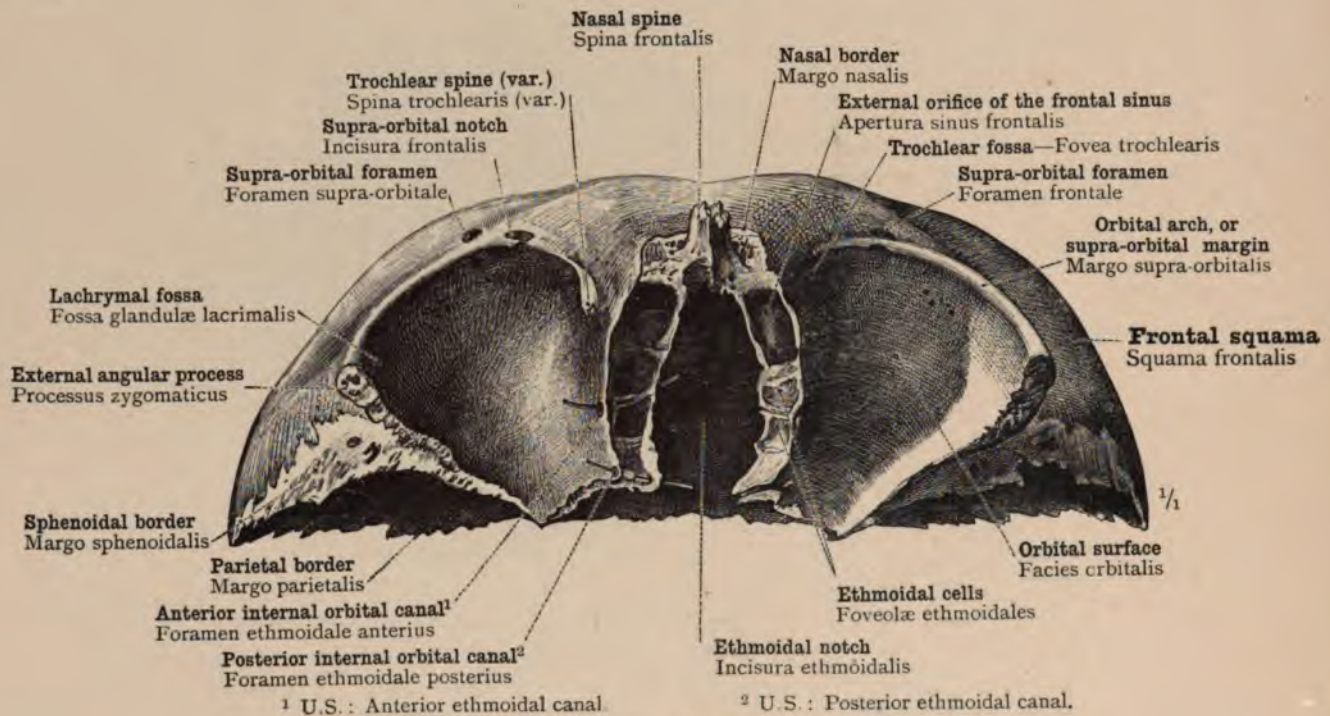


FIG. 153.—THE FRONTAL BONE SEEN FROM BELOW.

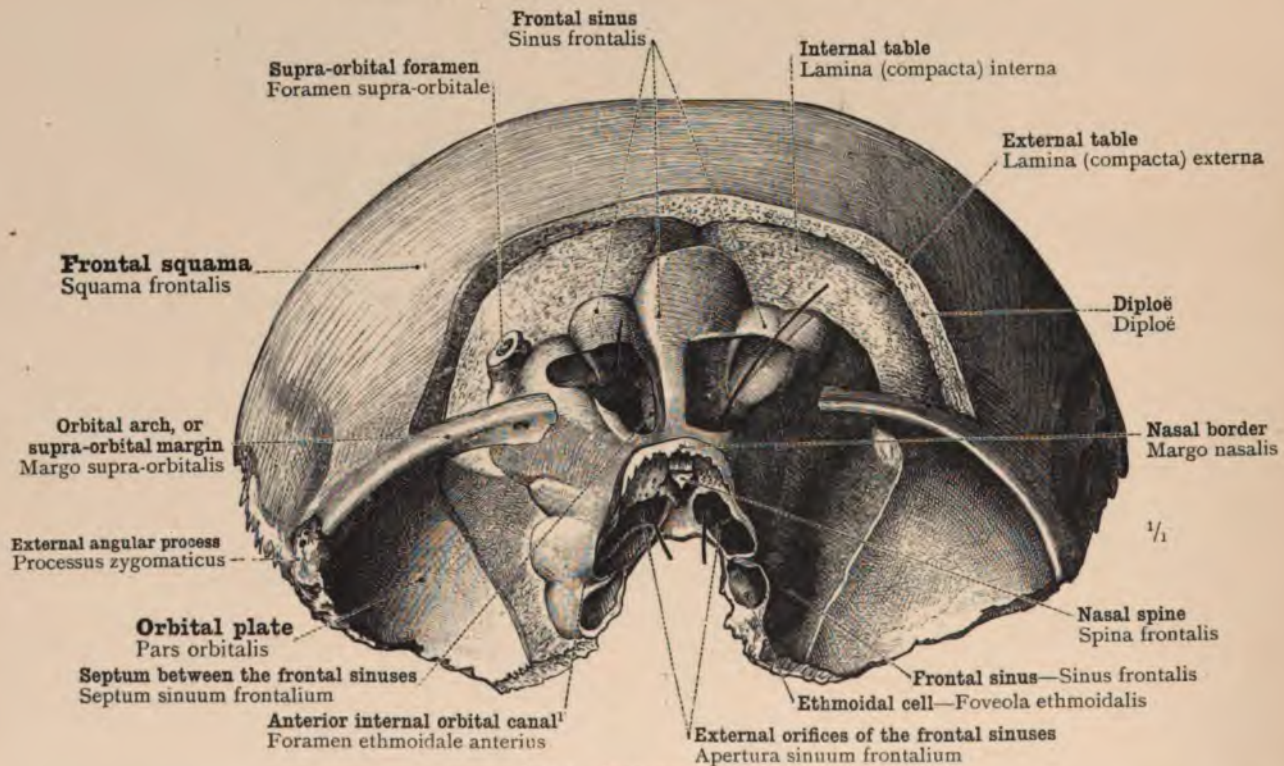


FIG. 154.—THE FRONTAL SINUSES, SINUS FRONTALES, SHOWN BY THE REMOVAL OF THE EXTERNAL TABLE AND THE DIPLOË, AND PARTLY OPENED UP. SEEN FROM BEFORE AND BELOW.

Os frontale—Frontal bone.

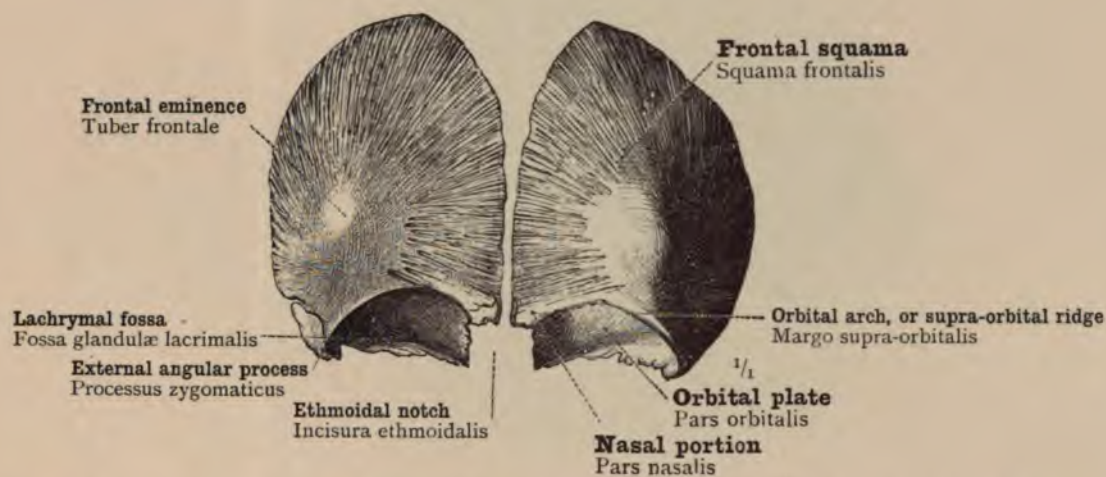


FIG. 155.—THE TWO HALVES OF THE FRONTAL BONE FROM A HUMAN FŒTUS IN THE EIGHTH MONTH (MONTHS OF FOUR WEEKS EACH). SEEN FROM BEFORE.

Body-length of fœtus 15 inches.

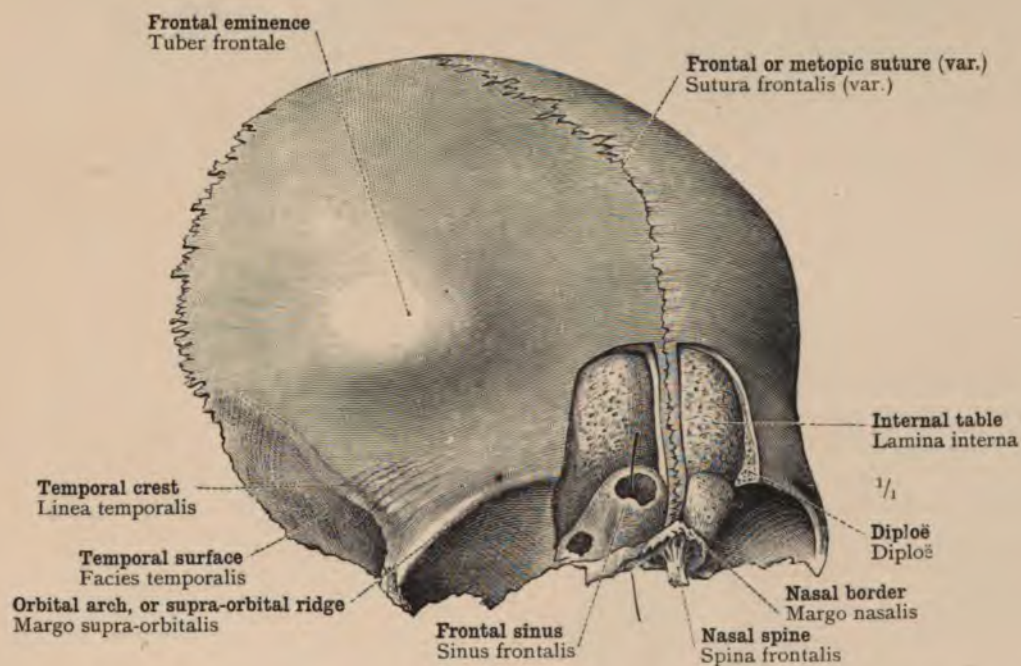


FIG. 156.—THE FRONTAL BONE OF A GIRL AGED SEVEN YEARS IN WHICH THE FRONTAL SINUSES HAVE BEEN EXPOSED. SEEN OBLIQUELY FROM BEFORE AND FROM THE RIGHT SIDE.

Development of the Frontal Bones.

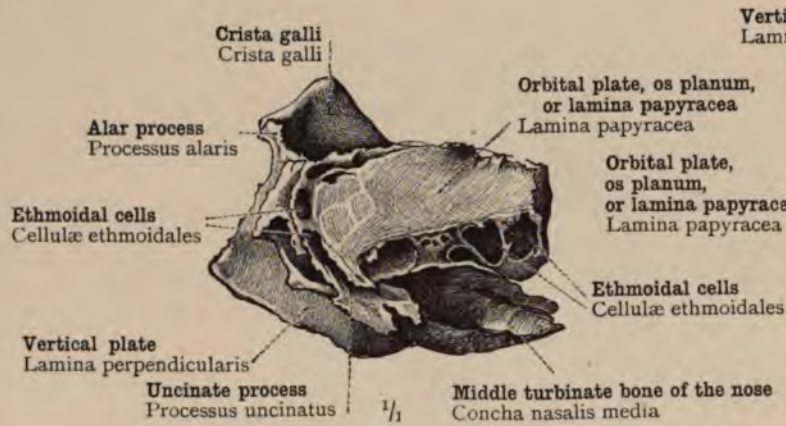


FIG. 157.—THE ETHMOID BONE SEEN FROM THE LEFT SIDE

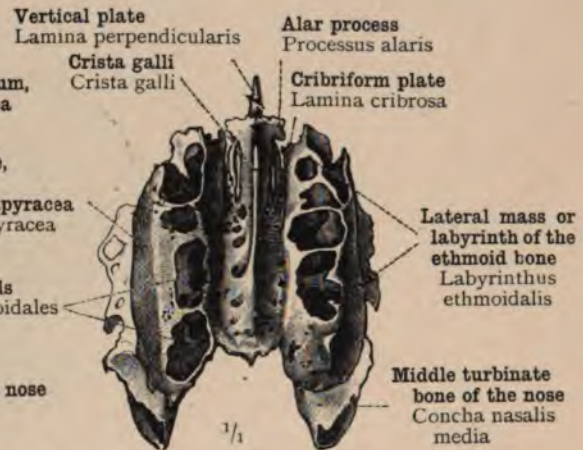


FIG. 158.—THE ETHMOID BONE SEEN FROM ABOVE.

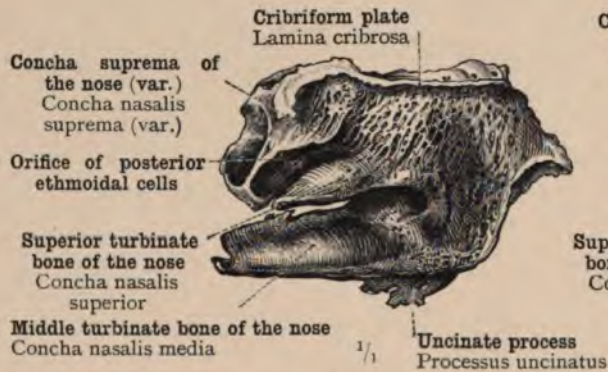


FIG. 159.—THE LEFT HALF OF THE ETHMOID BONE SEEN FROM WITHIN.

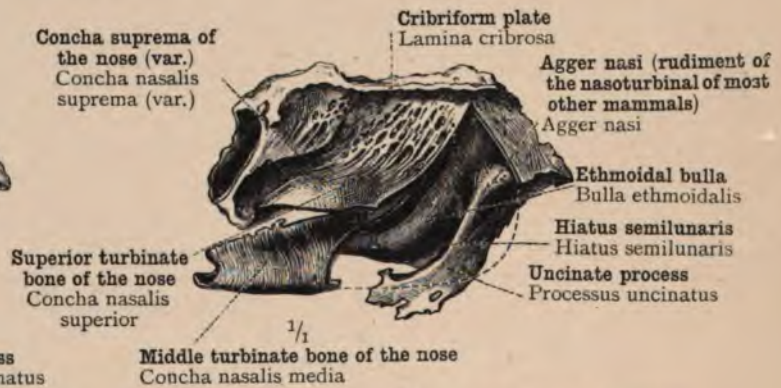


FIG. 160.—THE LEFT HALF OF THE ETHMOID BONE SEEN FROM WITHIN.

The anterior portion of the middle turbinate bone of the nose has been removed. The free border of the removed portion is indicated by a dotted line.

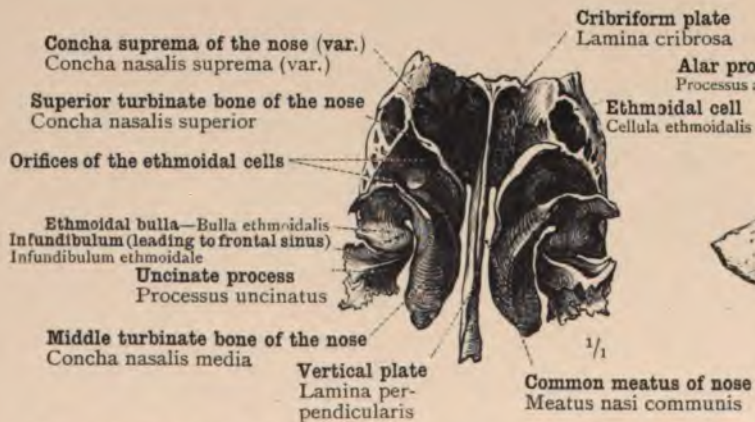


FIG. 161.—THE ETHMOID BONE SEEN FROM BEHIND AND BELOW.



FIG. 162.—AN ETHMOID BONE THE LEFT LATERAL MASS OF WHICH HAS BEEN REMOVED.

Os ethmoidale—Ethmoid bone.

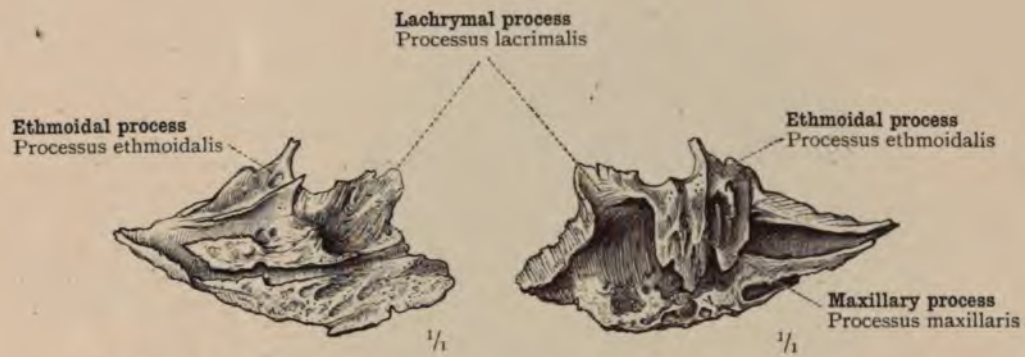


FIG. 163.—INNER SURFACE.

FIG. 164.—OUTER SURFACE.

CONCHA NASALIS INFERIOR—THE INFERIOR TURBINATE BONE OF THE LEFT SIDE.



FIG. 165.—EXTERNAL SURFACE.

FIG. 166.—INTERNAL SURFACE.

FIG. 167.—ANTERIOR SURFACE.

FIG. 168.—POSTERIOR SURFACE.

OS LACRIMALE: LACHRYMAL BONE OF THE LEFT SIDE.

OS NASALE: NASAL BONE OF THE LEFT SIDE.

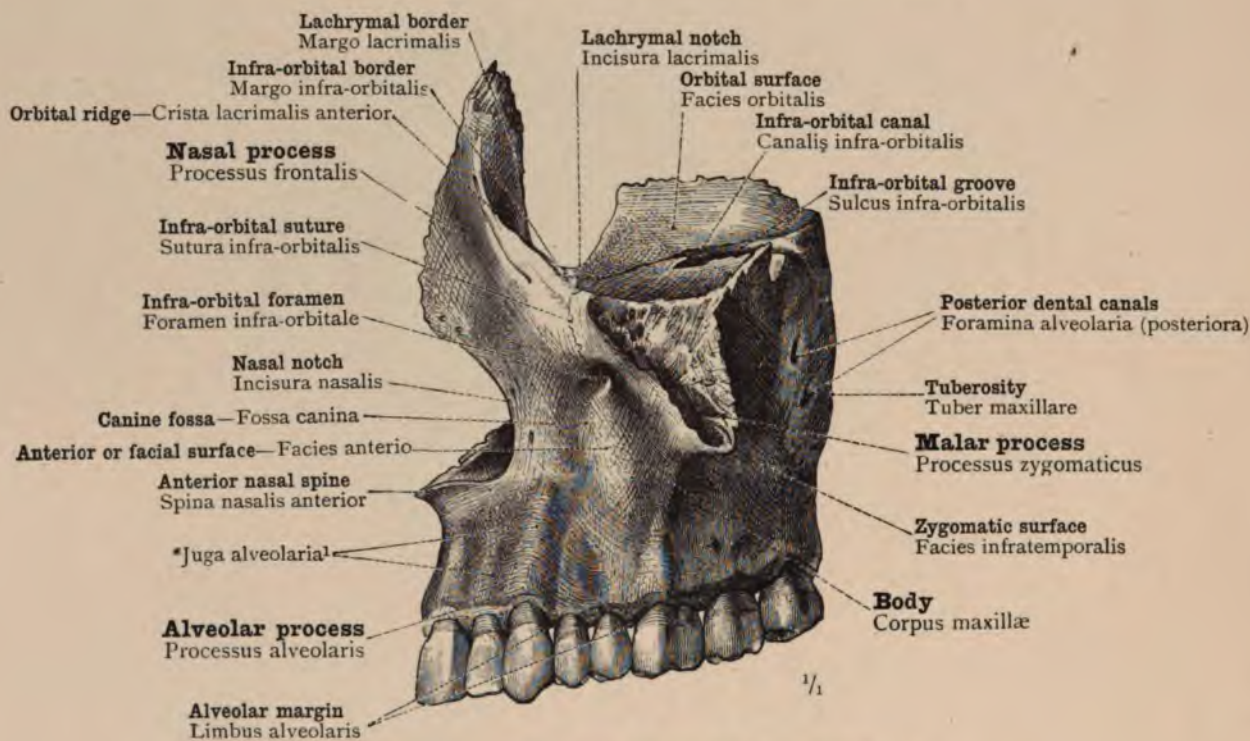


FIG. 169.—SEEN FROM THE LEFT SIDE.

FIG. 170.—SEEN FROM ABOVE.

VOMER—THE VOMER.

Bones of the Nasal Region.



¹ Eminences corresponding in position to the fangs of the teeth.

FIG. 171.—LEFT SUPERIOR MAXILLARY BONE: EXTERNAL SURFACE.

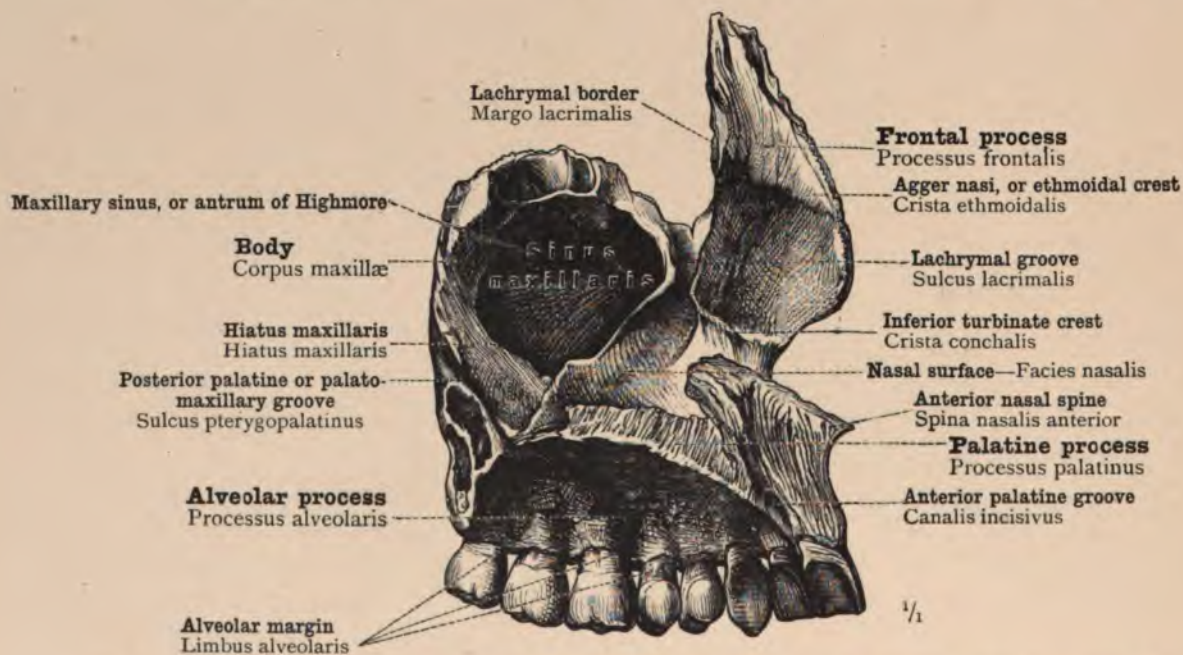


FIG. 172.—LEFT SUPERIOR MAXILLARY BONE: INTERNAL SURFACE. VIEW INTO THE MAXILLARY SINUS, OR ANTRUM OF HIGHMORE.

Maxilla—Superior maxilla.

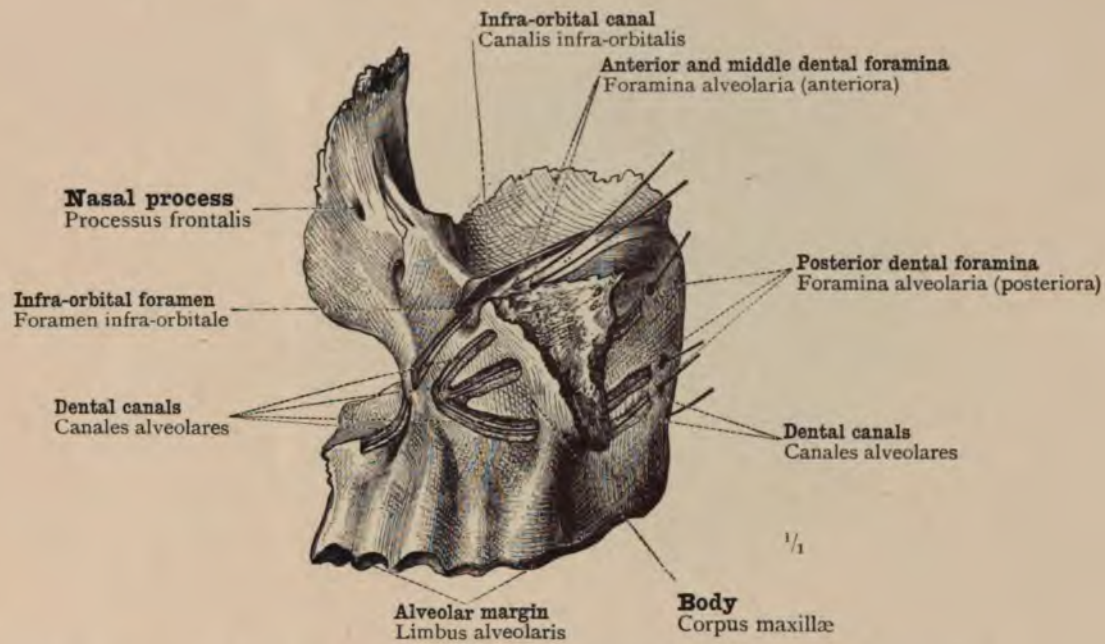


FIG. 173.—THE LEFT SUPERIOR MAXILLARY BONE. EXTERNAL SURFACE.

The dental canals are exposed by partial removal of the superficial plate of bone, and their course is shown by means of bristles passed through them.

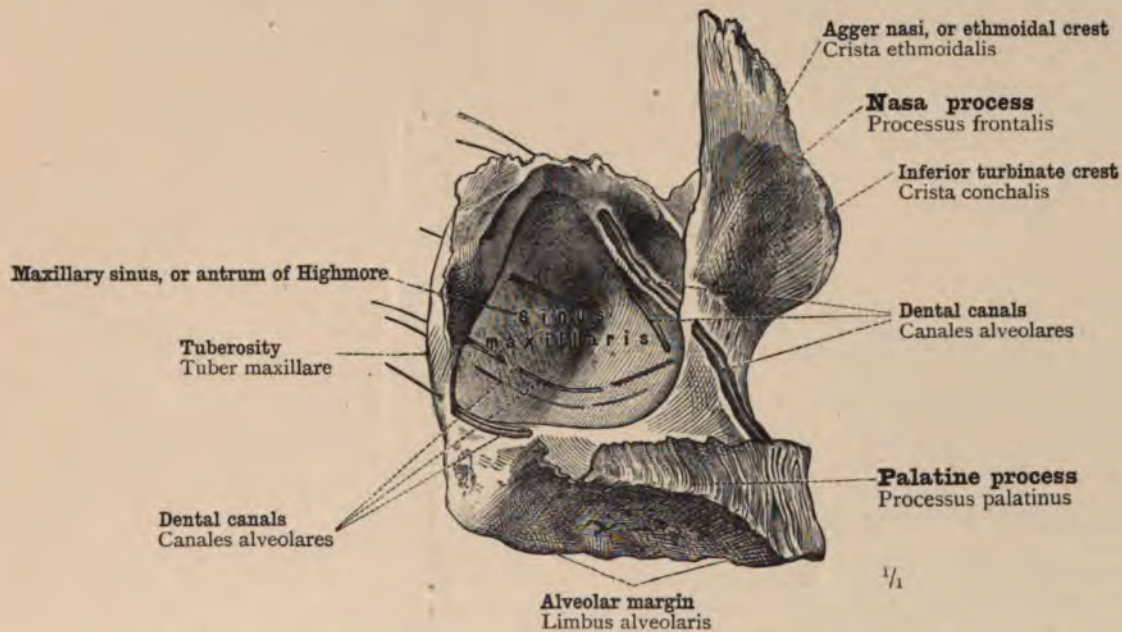


FIG. 174.—THE LEFT SUPERIOR MAXILLARY BONE. INTERNAL SURFACE.

The foremost and the hindmost of the dental canals have been exposed by the removal of the superficial plate of bone. By means of bristles passed through the canals the situation of the respective dental foramina is indicated.

Maxilla—Superior maxillary bone.

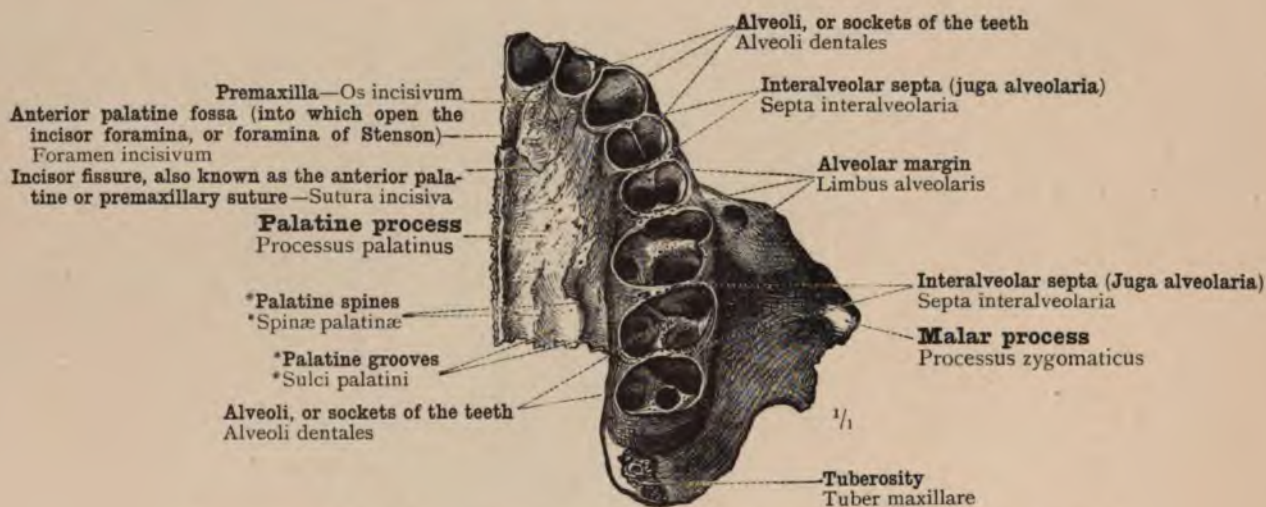


FIG. 175.—THE LEFT SUPERIOR MAXILLARY BONE. SEEN FROM BELOW.



FIG. 176.—SEEN FROM THE INNER SIDE.

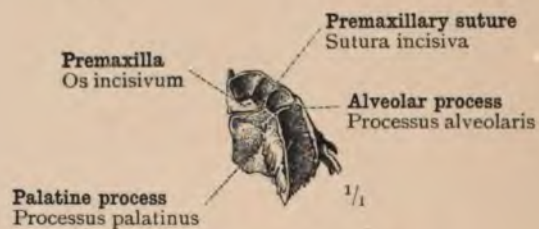


FIG. 177.—SEEN FROM BELOW.

THE LEFT SUPERIOR MAXILLARY BONE OF A FŒTUS AT THE END OF SIXTH MONTH (MONTHS OF FOUR WEEKS EACH).

Body-length, 12 inches.

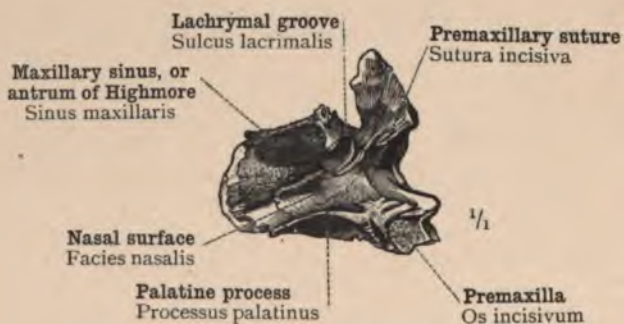


FIG. 178.—SEEN FROM THE INNER SIDE.

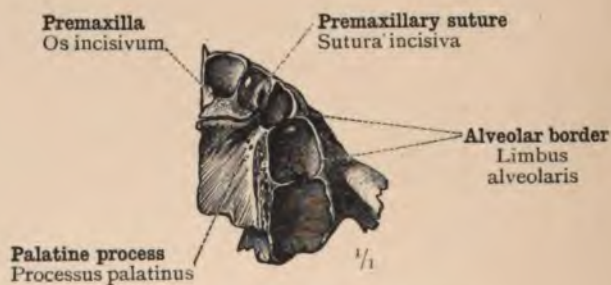


FIG. 179. SEEN FROM BELOW.

THE LEFT SUPERIOR MAXILLARY BONE OF A BOY BORN AT FULL TERM.

Body-length, 21 inches.

Maxilla—Superior maxillary bone.

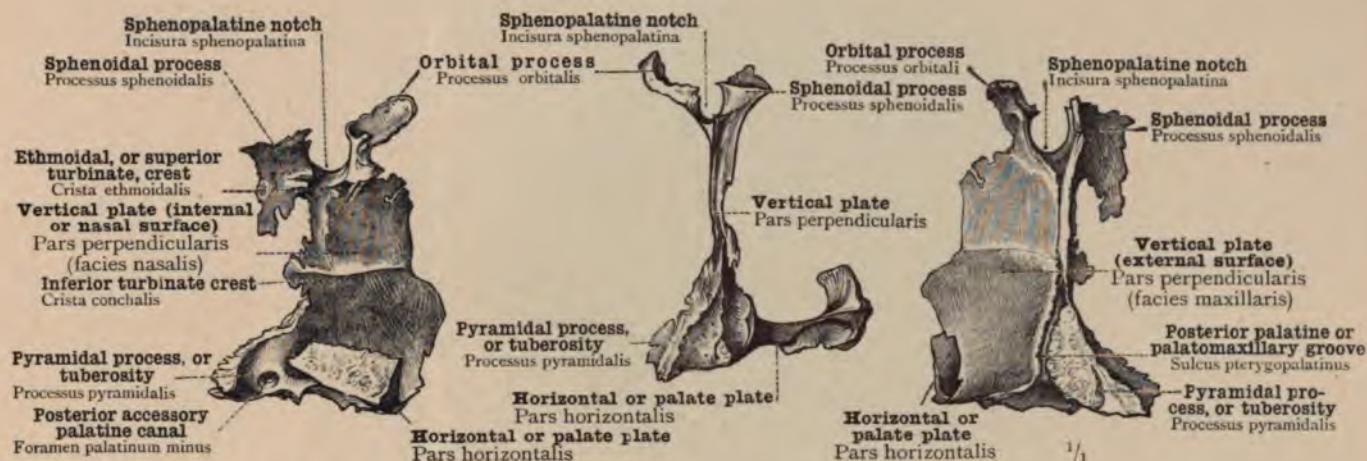


FIG. 180.—INNER SURFACE. FIG. 181.—SEEN FROM BEHIND. FIG. 182.—OUTER SURFACE.
OS PALATINUM.—THE PALATE-BONE (OF THE LEFT SIDE).

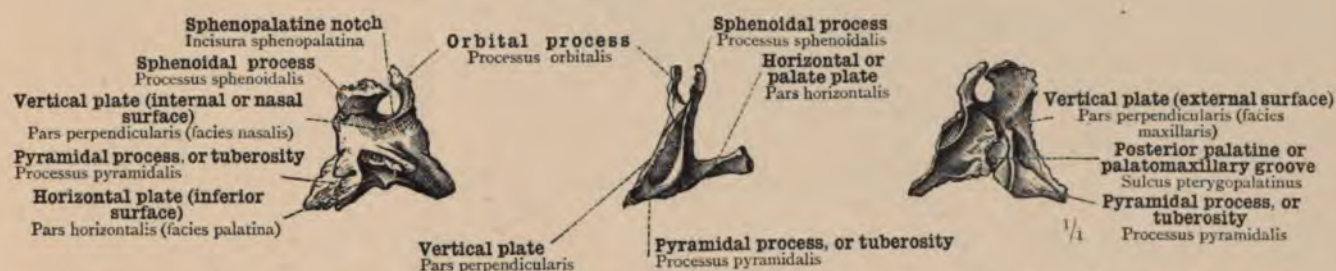


FIG. 183.—INNER SURFACE. FIG. 184.—SEEN FROM BEHIND. FIG. 185.—OUTER SURFACE.
THE LEFT PALATE-BONE OF A BOY BORN AT FULL TERM.
Body-length, 21 inches.

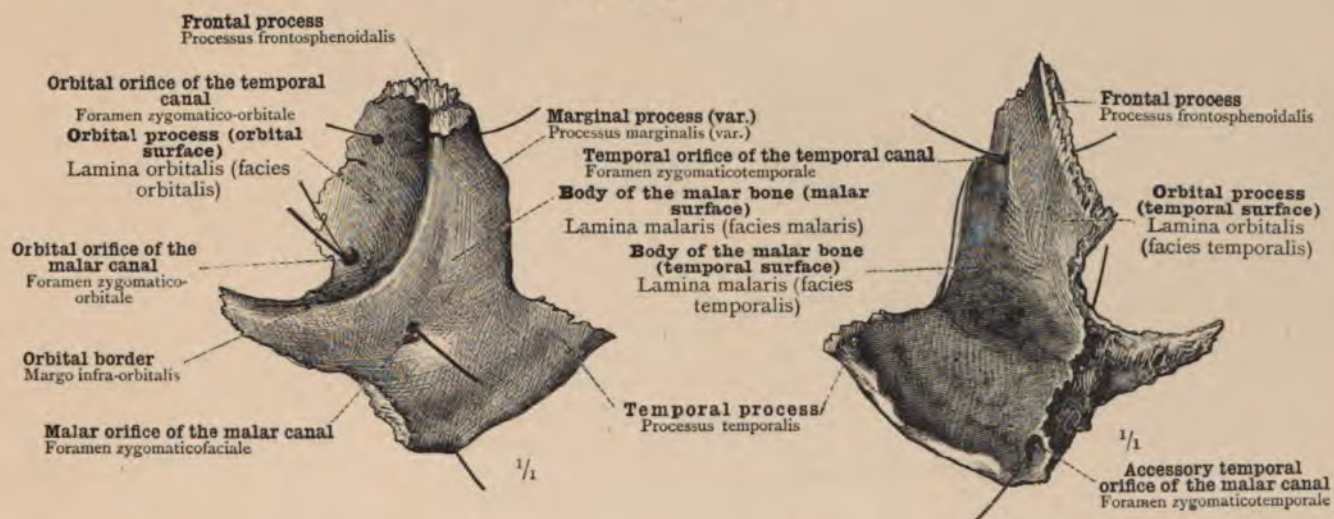


FIG. 186.—SEEN FROM BEFORE. FIG. 187.—SEEN FROM BEHIND.
OS ZYGOMATICUM—MALAR BONE (OF THE LEFT SIDE).

Supplementary Bones of the Upper Jaw.

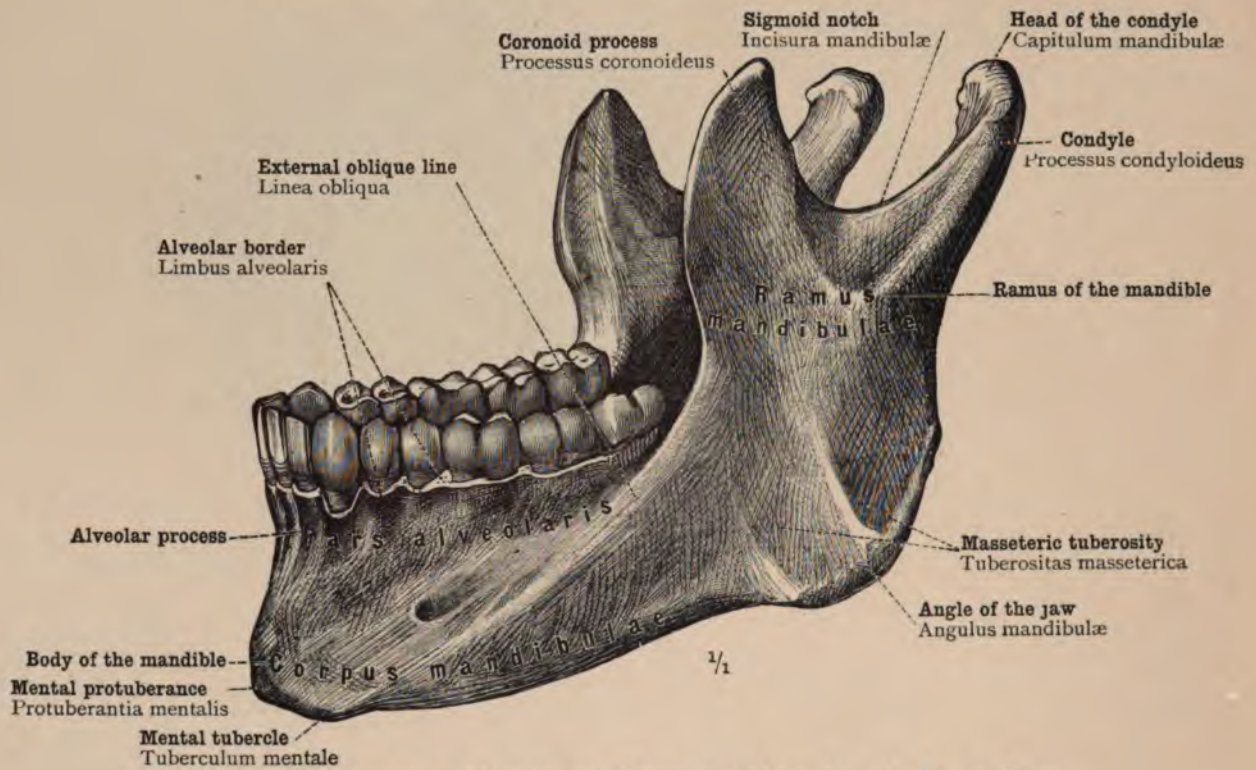


FIG. 188.—THE INFERIOR MAXILLARY BONE SEEN FROM THE LEFT SIDE.

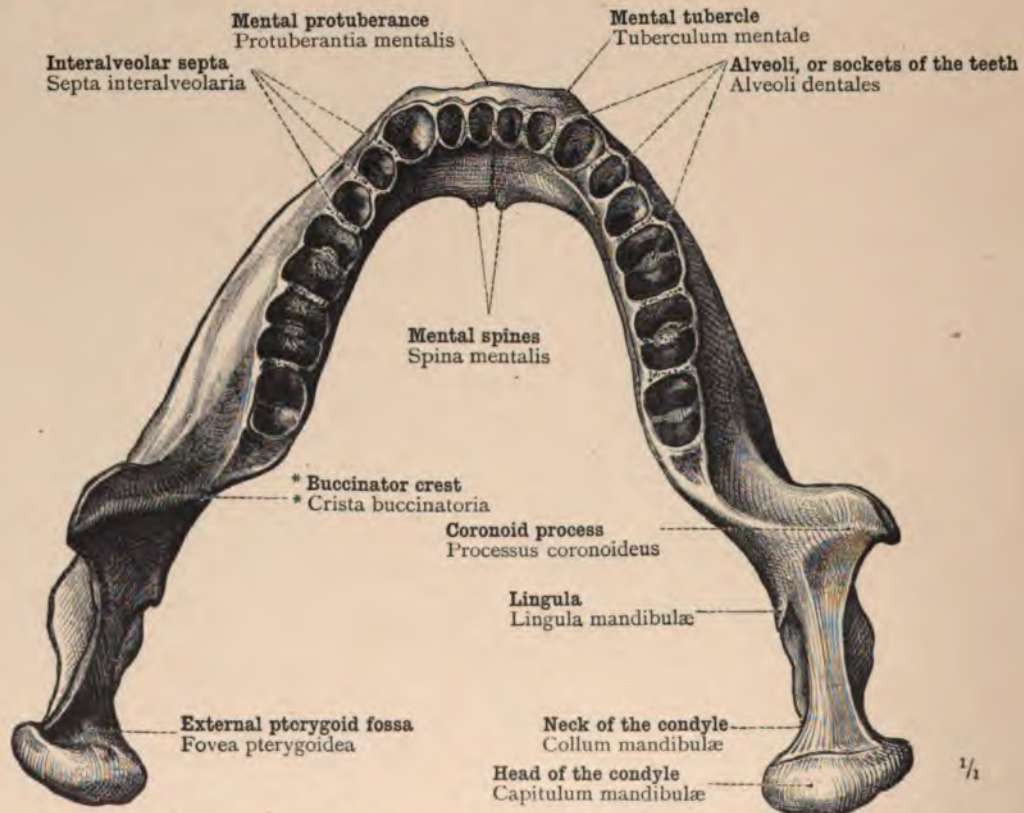


FIG. 189.—THE INFERIOR MAXILLARY BONE SEEN FROM ABOVE.

Mandibula—The inferior maxillary bone, lower jaw, or mandible.

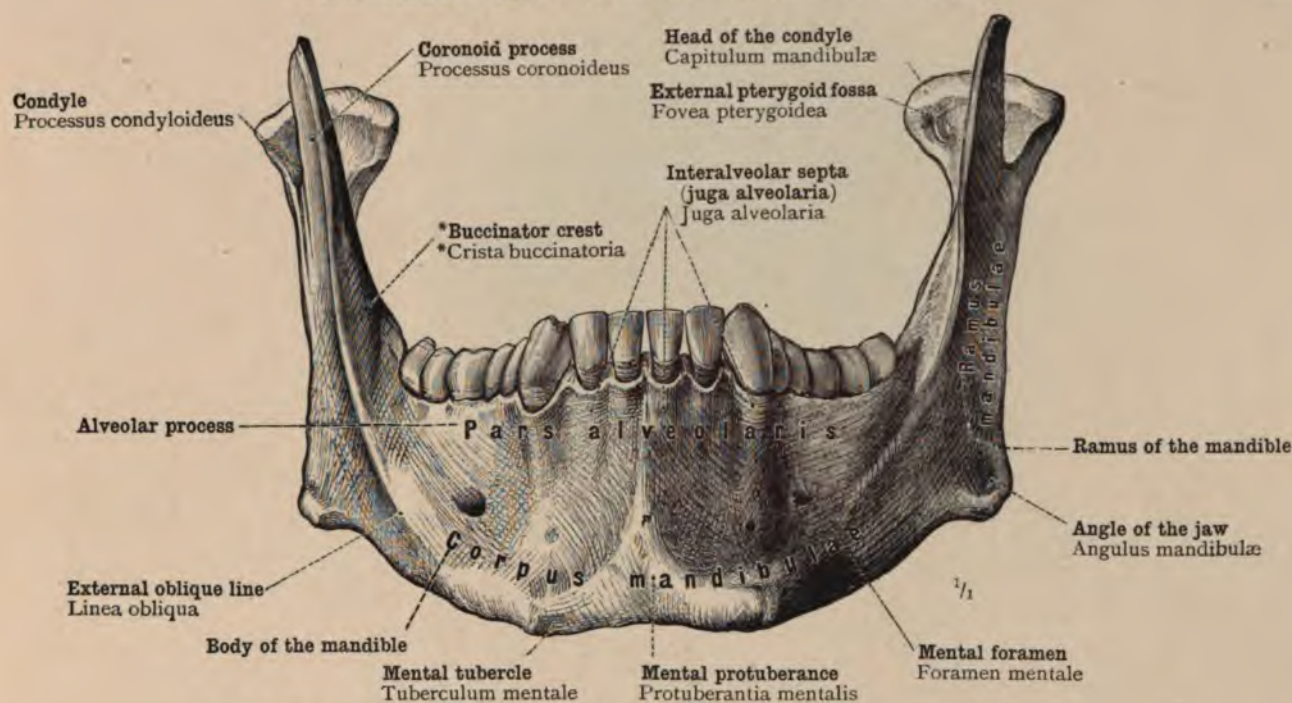


FIG. 190.—THE INFERIOR MAXILLARY BONE SEEN FROM BEFORE.

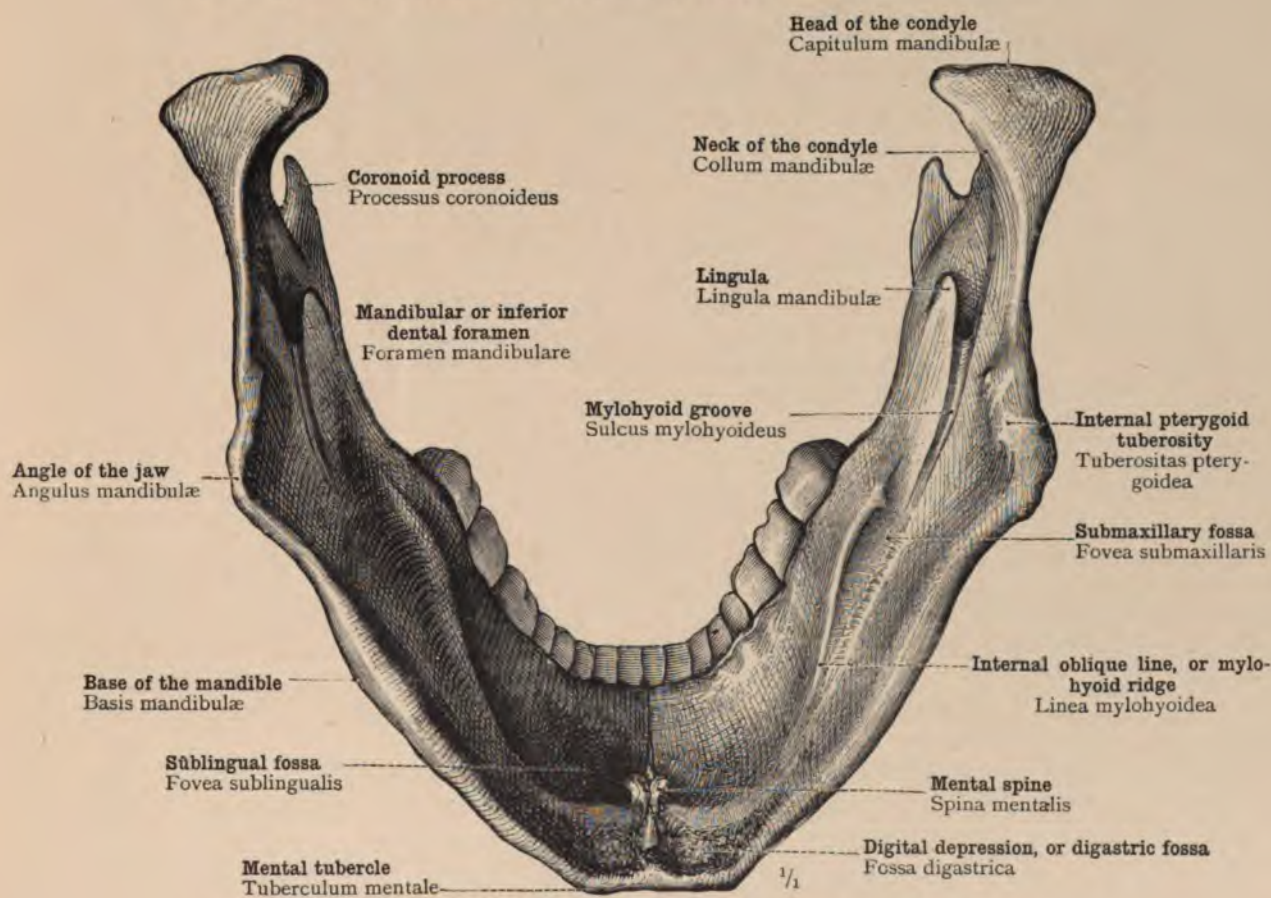


FIG. 191.—THE INFERIOR MAXILLARY BONE SEEN FROM BEHIND.

Mandibula—The inferior maxillary bone, lower jaw, or mandible.

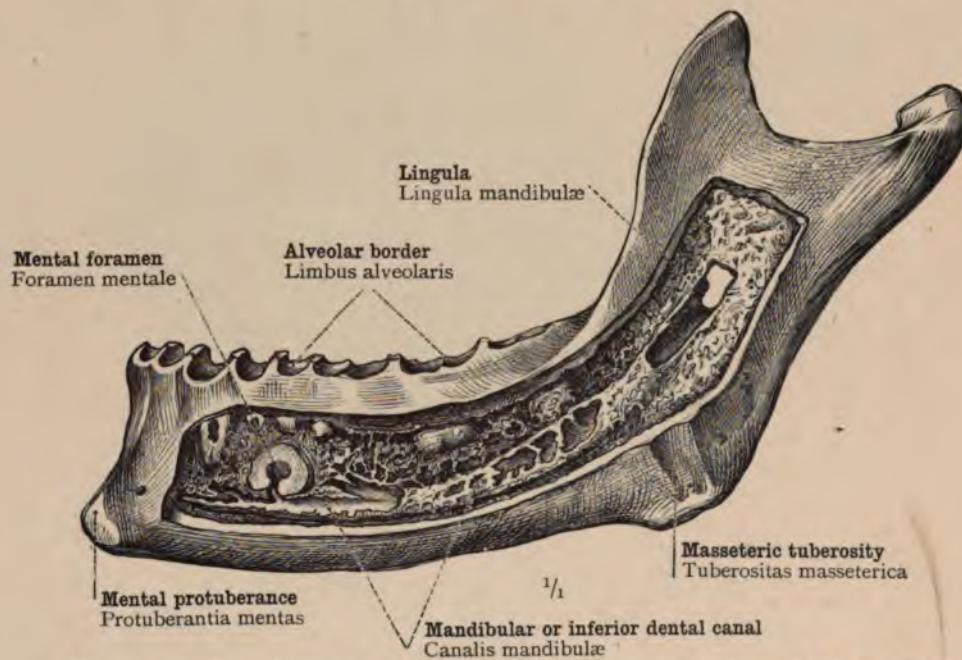


FIG. 192.—THE INFERIOR MAXILLARY BONE SEEN FROM THE LEFT SIDE.

The mandibular or inferior dental canal has been exposed by the removal of a portion of the superficial plate of bone.

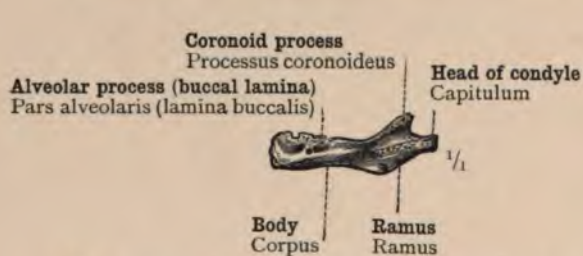


FIG. 193.—SEEN FROM THE OUTER SIDE.

THE LEFT HALF OF THE INFERIOR MAXILLARY BONE OF A HUMAN EMBRYO AT THE END OF THE FIFTH MONTH (MONTHS OF FOUR WEEKS EACH).

Body-length, $7\frac{1}{2}$ inches.

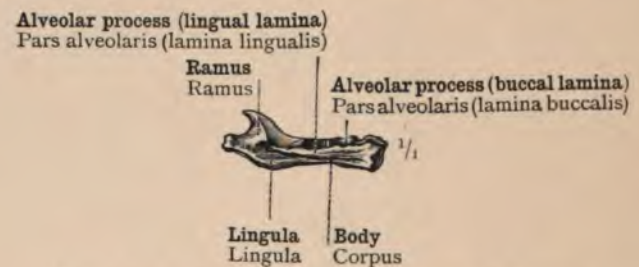


FIG. 194.—SEEN FROM THE INNER SIDE.

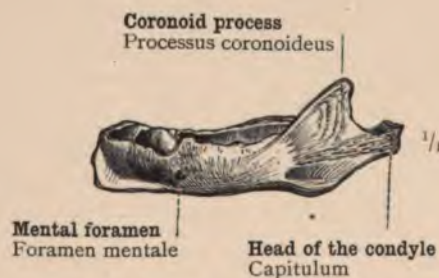


FIG. 195.—SEEN FROM THE OUTER SIDE.

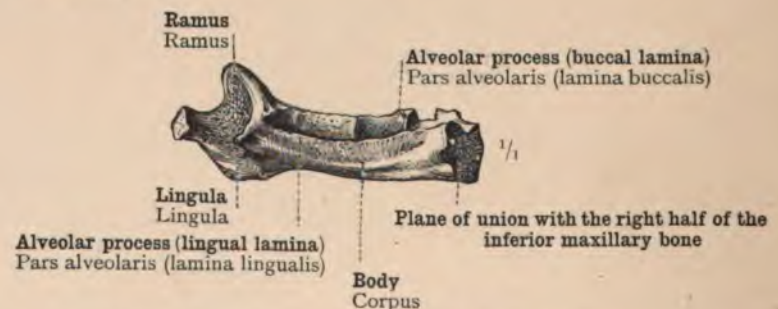


FIG. 196.—SEEN FROM THE INNER SIDE.

THE LEFT HALF OF THE INFERIOR MAXILLARY BONE OF A HUMAN EMBRYO IN THE MIDDLE OF THE EIGHTH MONTH (MONTHS OF FOUR WEEKS EACH).

Body-length, 15 inches.

Mandibula—The inferior maxillary bone, lower jaw, or mandible.

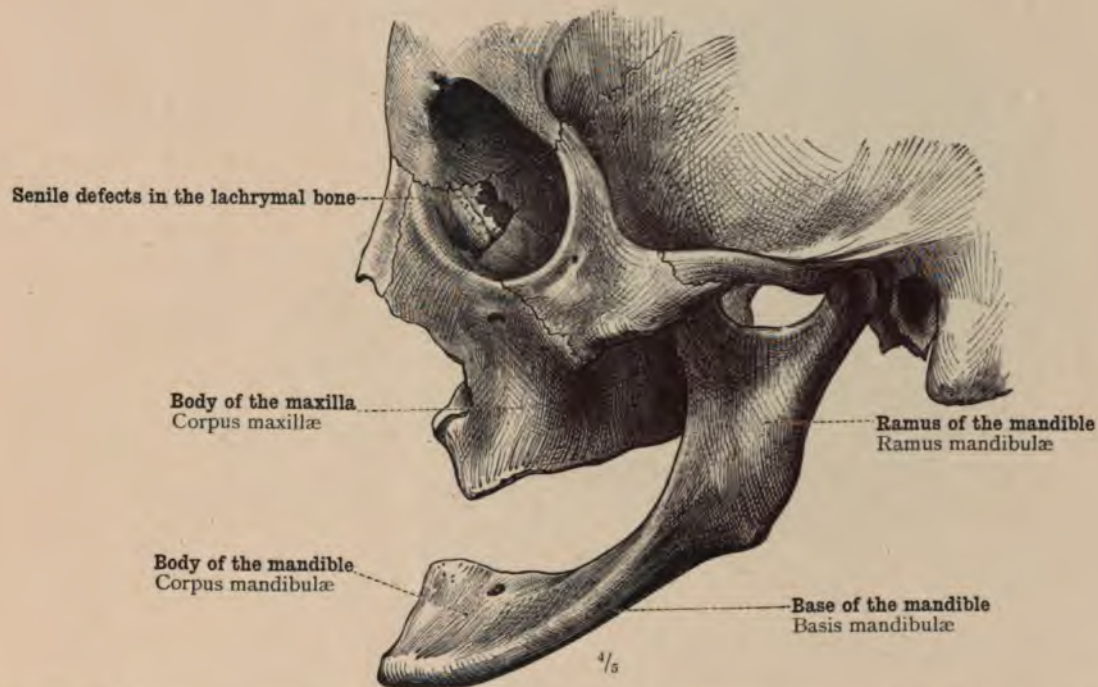


FIG. 197.—FACIAL PORTION OF THE SKULL OF A WOMAN AGED EIGHTY-FOUR YEARS, SHOWING ATROPHY OF THE ALVEOLAR PROCESSES OF THE SUPERIOR AND INFERIOR MAXILLARY BONES (NUTCRACKER FACE).

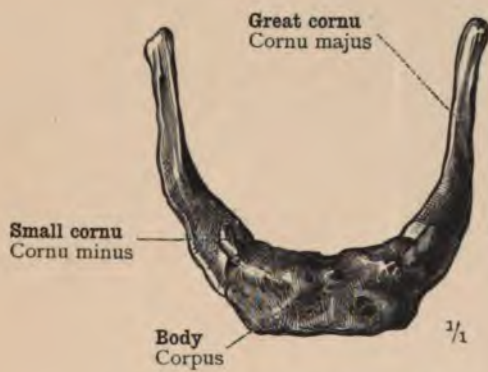


FIG. 198.—SEEN FROM ABOVE.

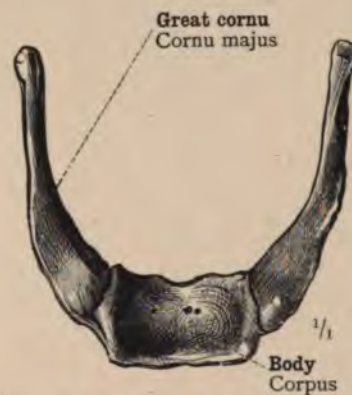


FIG. 199.—SEEN FROM BELOW.

OS HYOIDEUM—THE HYOID BONE.



FIG. 200.—THE HYOID BONE OF A BOY, STILL-BORN AT FULL TERM.
Body-length, 21 inches.

Senile atrophy of the jaws : Os hyoideum—The hyoid bones.

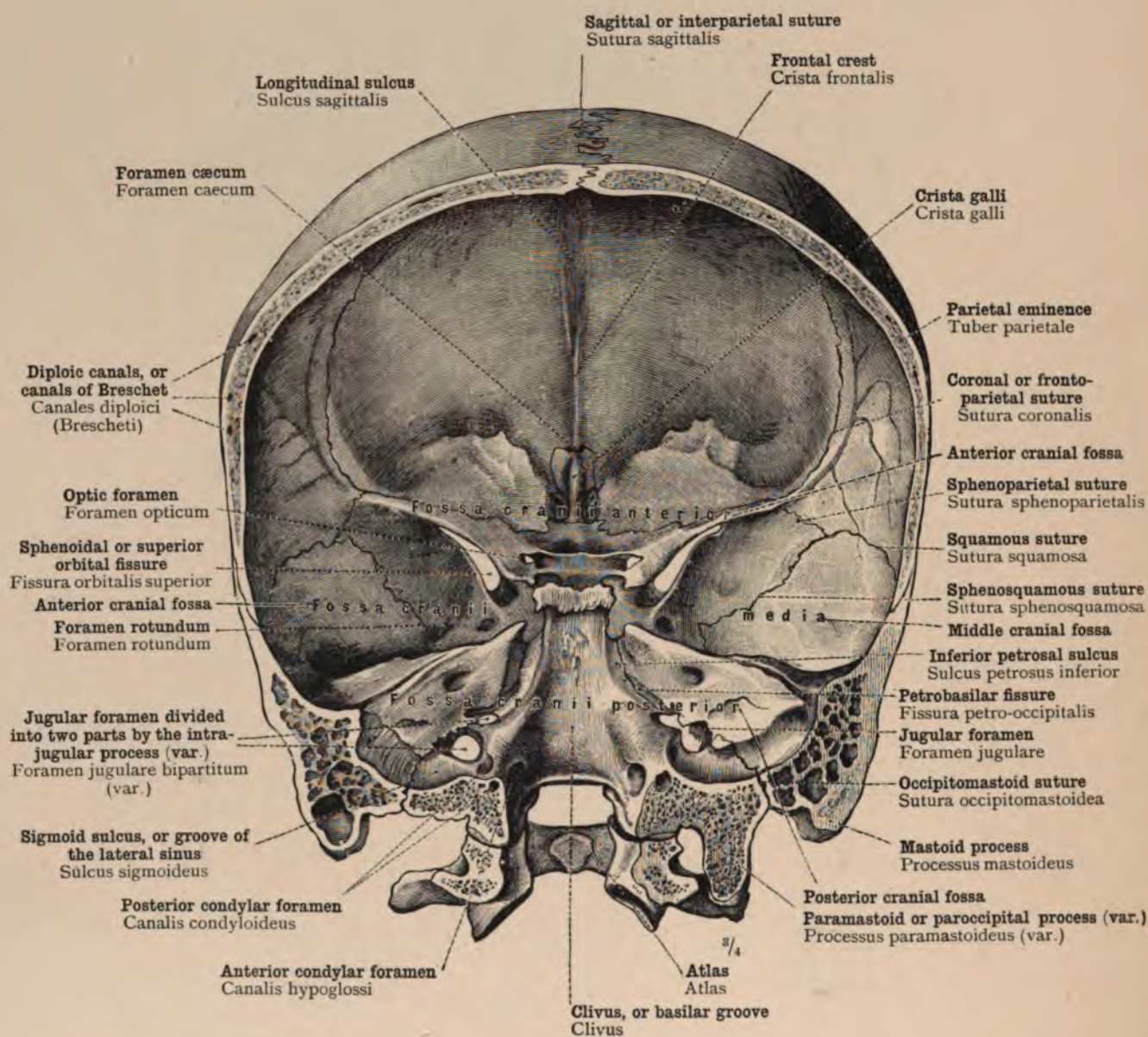


FIG. 201.—SKULL DIVIDED INTO AN ANTERIOR AND A POSTERIOR PORTION BY A FRONTAL SECTION PASSING THROUGH THE MASTOID PROCESSES. THE FIRST CERVICAL VERTEBRA HAS ALSO BEEN DIVIDED BY THE SECTION, AND LEFT ATTACHED TO THE SKULL.

VIEW OF THE ANTERIOR PORTION OF THE CRANIAL CAVITY. THE ANTERIOR AND MIDDLE CRANIAL FOSSÆ, AS WELL AS THE ANTERIOR PORTION OF THE POSTERIOR CRANIAL FOSSA, SEEN FROM BEHIND. ON THE RIGHT SIDE IS A PARAMASTOID PROCESS ARTICULATING WITH THE ATLAS.

Cavum cranii cerebralis—Cranial cavity.

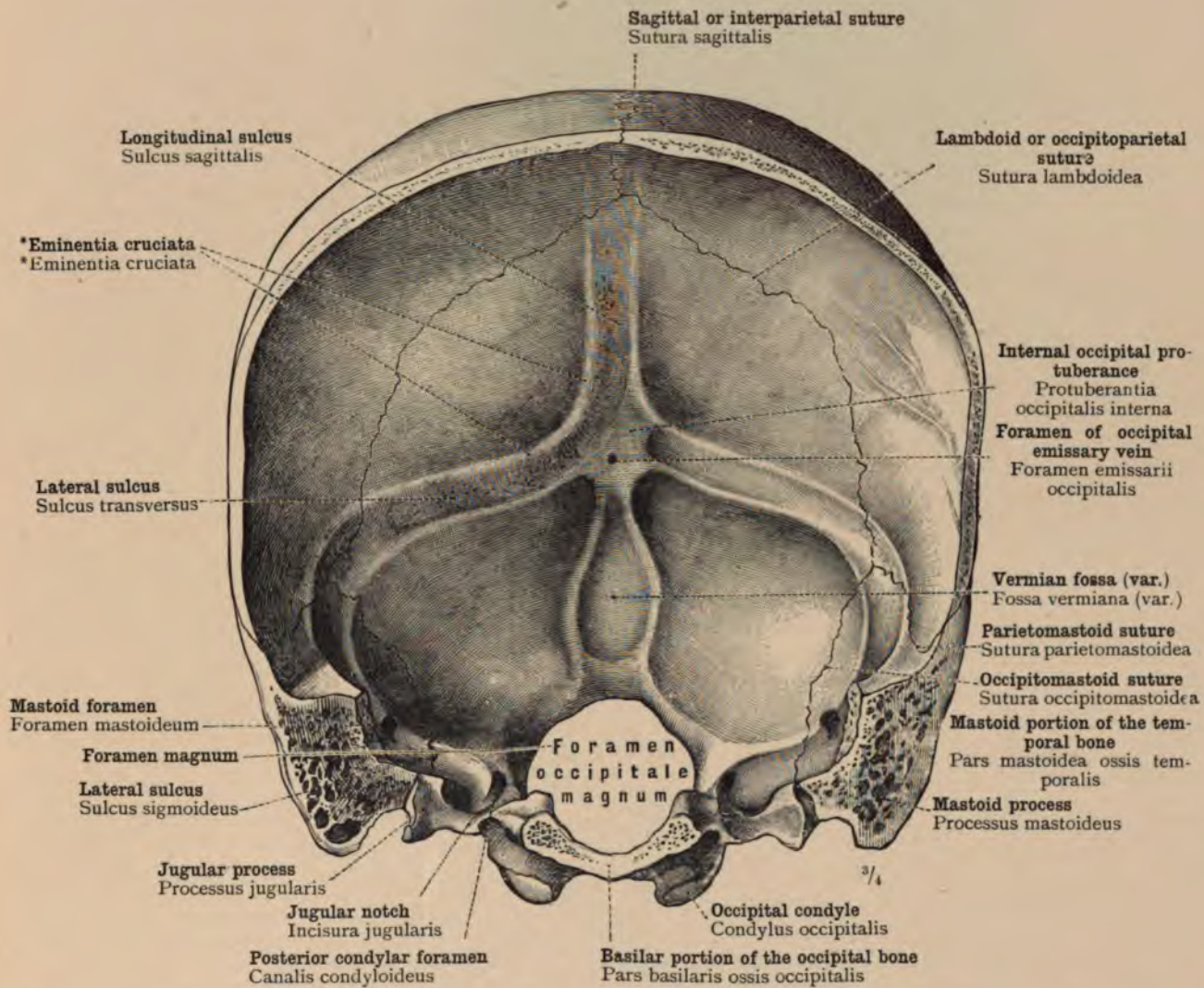
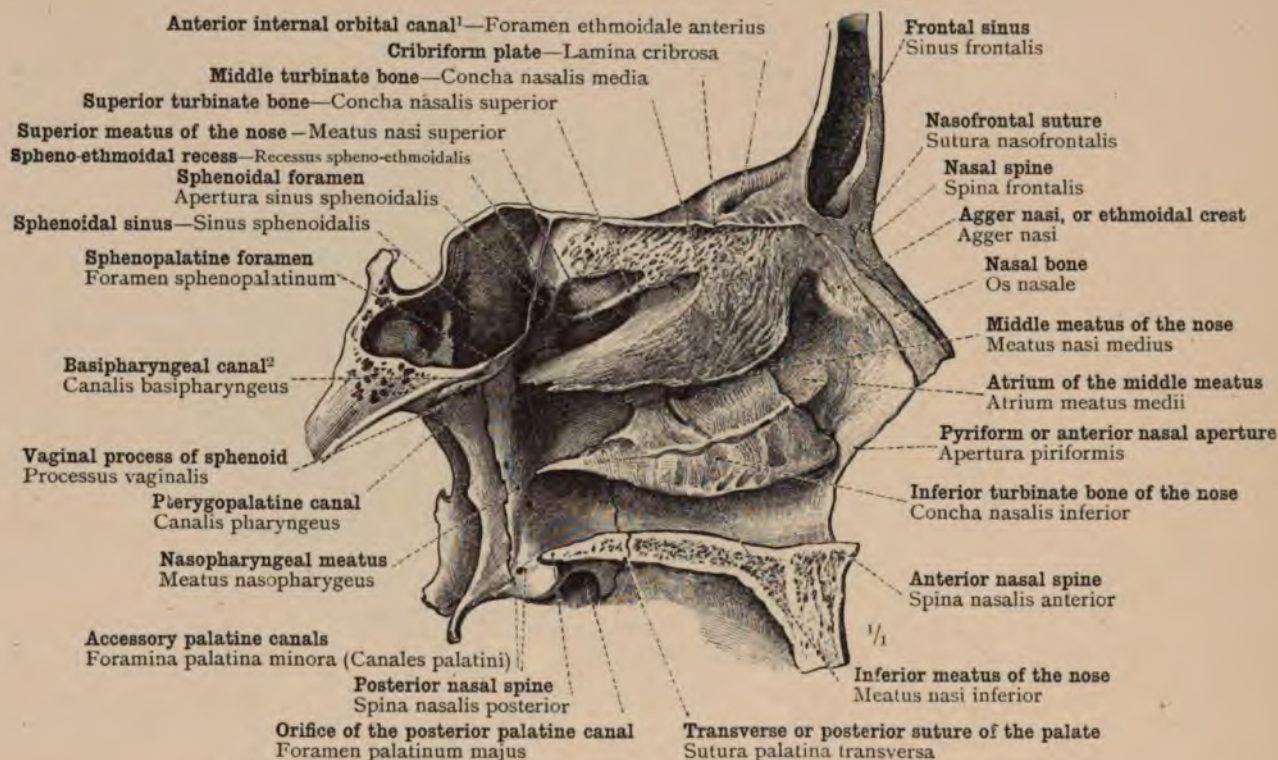


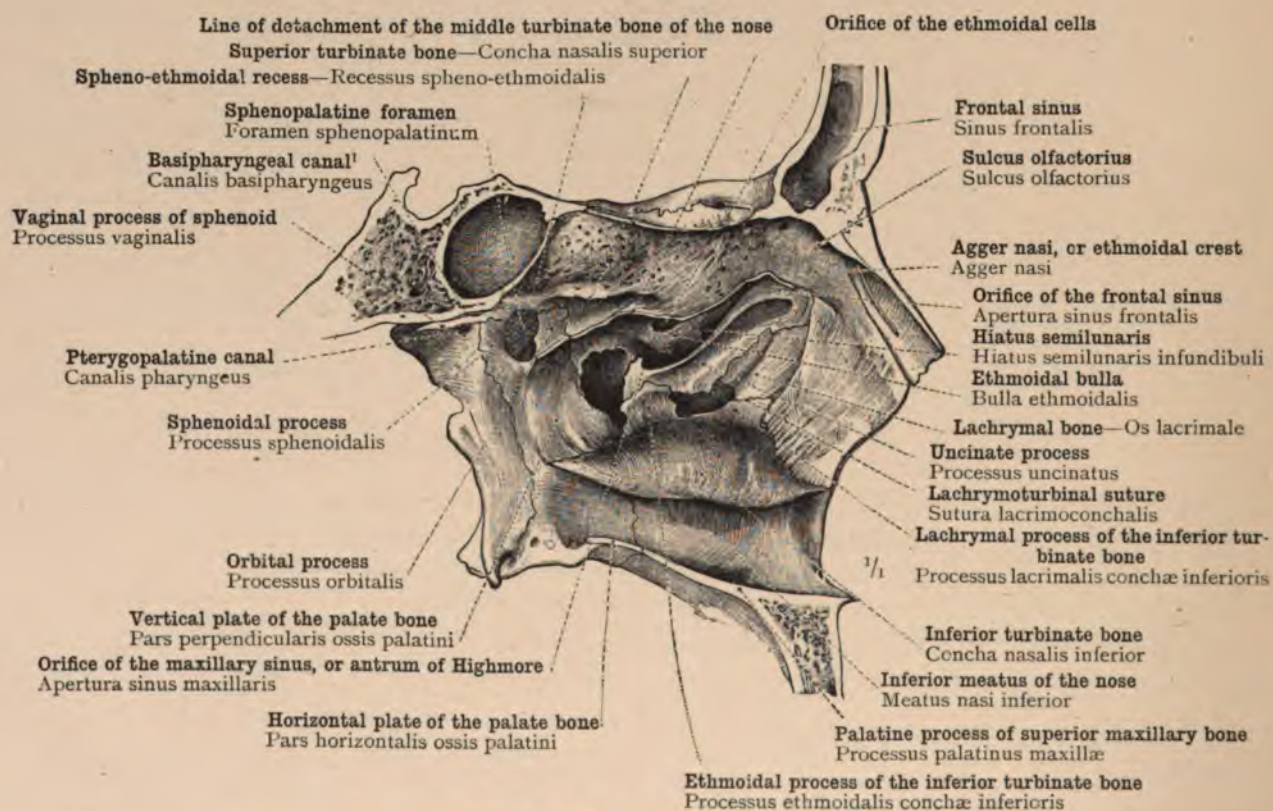
FIG. 202.—SKULL DIVIDED INTO AN ANTERIOR AND A POSTERIOR PORTION BY A FRONTAL SECTION PASSING THROUGH THE MASTOID PROCESSES AND THE BASILAR PORTION OF THE OCCIPITAL BONE. VIEW OF THE POSTERIOR PORTION OF THE CRANIAL CAVITY. THE WHOLE COURSE OF THE LATERAL SULCUS, FROM THE INTERNAL OCCIPITAL PROTUBERANCE TO THE JUGULAR FORAMEN, IS VISIBLE ON BOTH SIDES.



¹ U.S.: Anterior ethmoidal canal.

² See note to p. 48.

FIG. 203.—THE EXTERNAL WALL OF THE NASAL CAVITY WITH THE TURBinate BONES AND THE NASAL MEATUS: MEDIAN SAGITTAL SECTION. LEFT SIDE.



¹ See note to p. 48.

FIG. 204.—THE EXTERNAL WALL OF THE NASAL CAVITY: MEDIAN SAGITTAL SECTION. LEFT SIDE.

The middle turbinate bone of the nose has been cut away.

Cavum nasi—Nasal cavity.

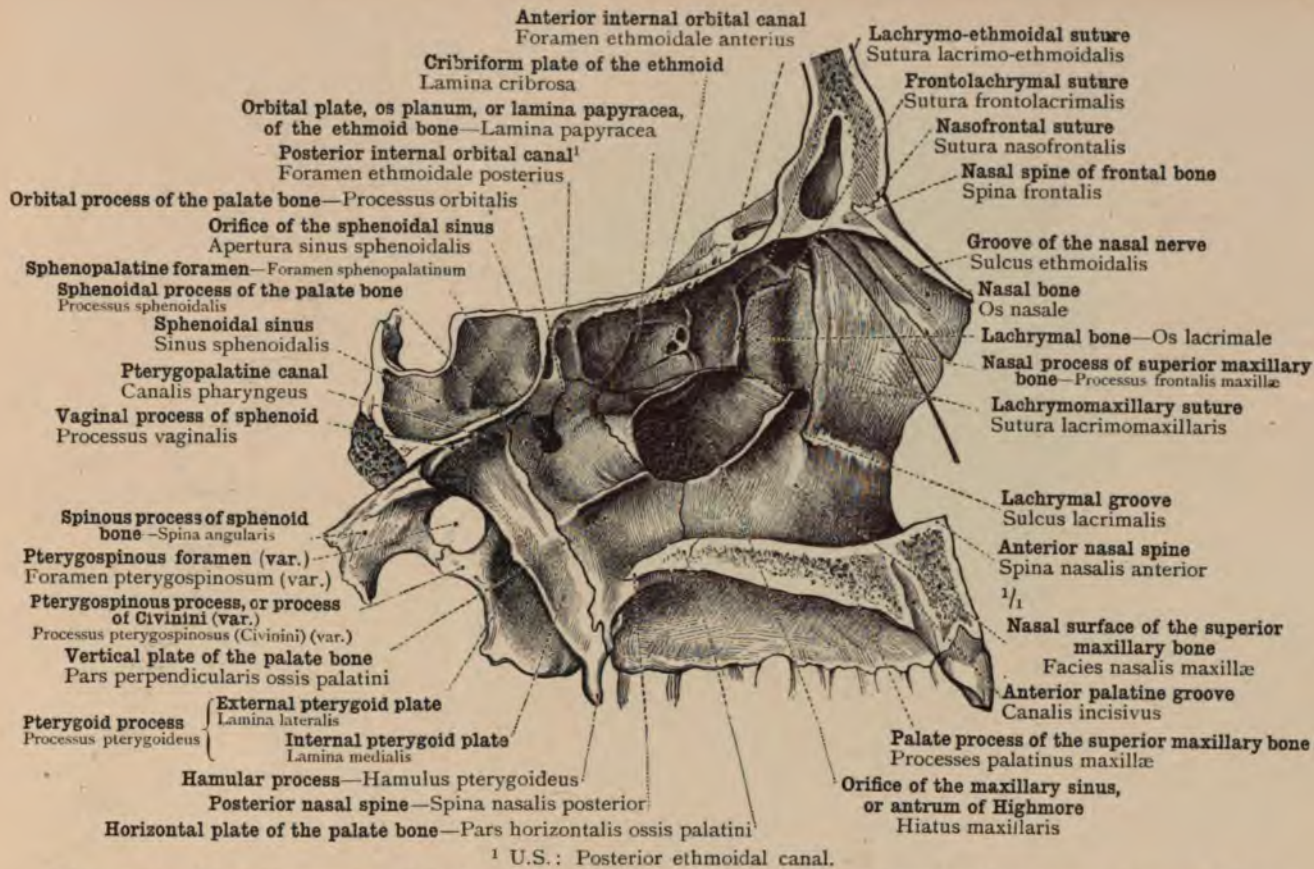


FIG. 205.—THE EXTERNAL WALL OF THE NASAL CAVITY AFTER REMOVAL OF THE THREE TURBinate BONES AND THE LATERAL MASS OF THE ETHMOID: MEDIAN SAGITTAL SECTION, LEFT SIDE.

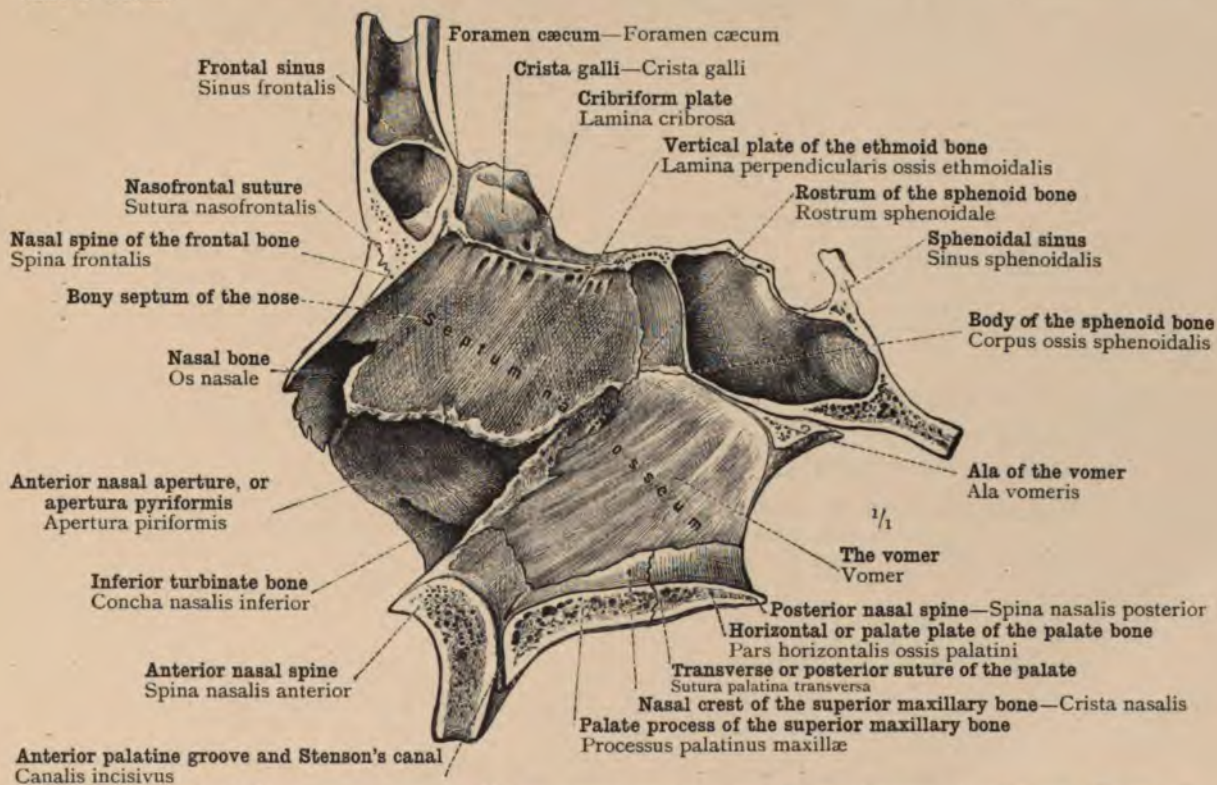
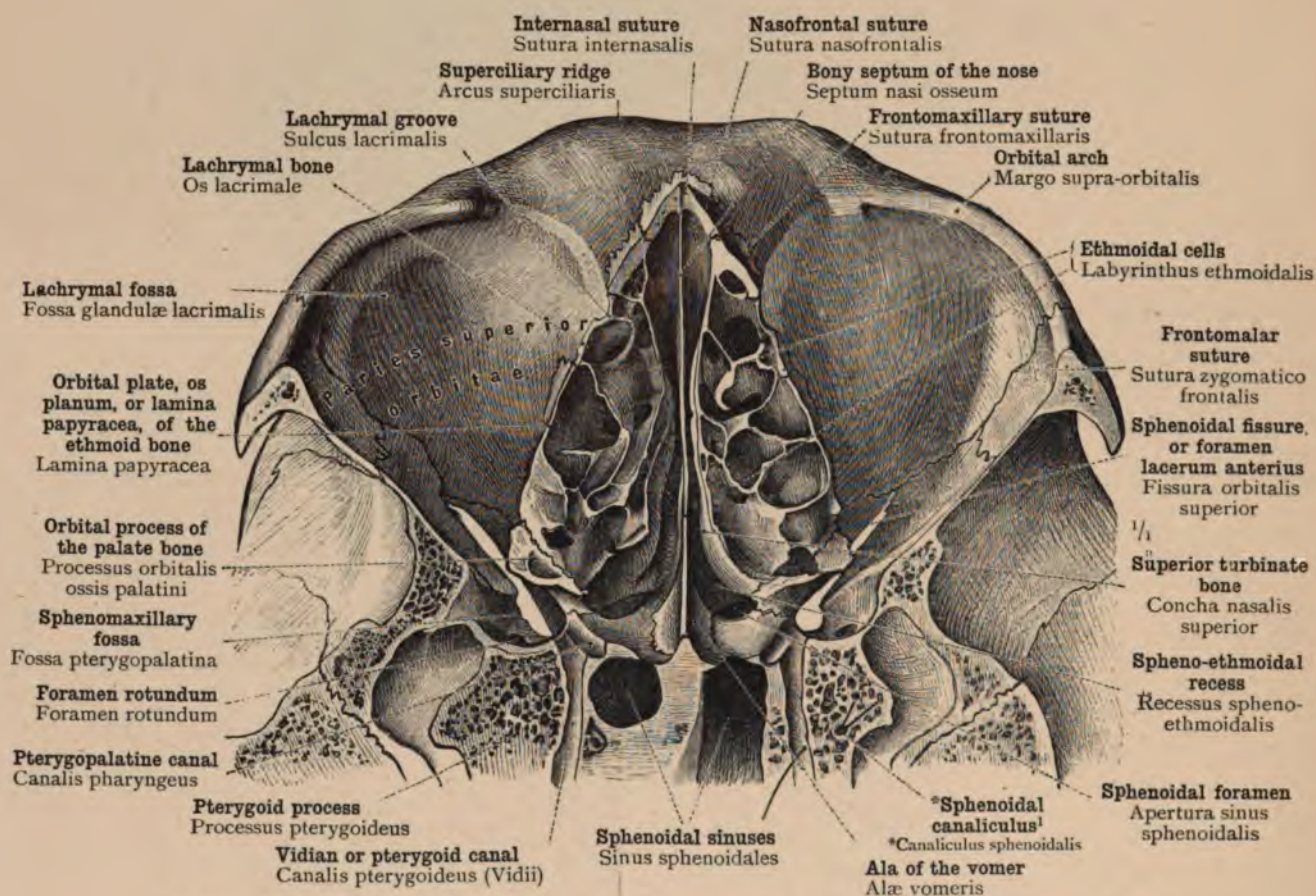


FIG. 206.—THE BONY SEPTUM OF THE NOSE SEEN FROM THE LEFT SIDE: SAGITTAL SECTION OF THE FACIAL PART OF THE SKULL, A LITTLE TO THE LEFT OF THE MEDIAN PLANE.

Cavum nasi—Nasal cavity.

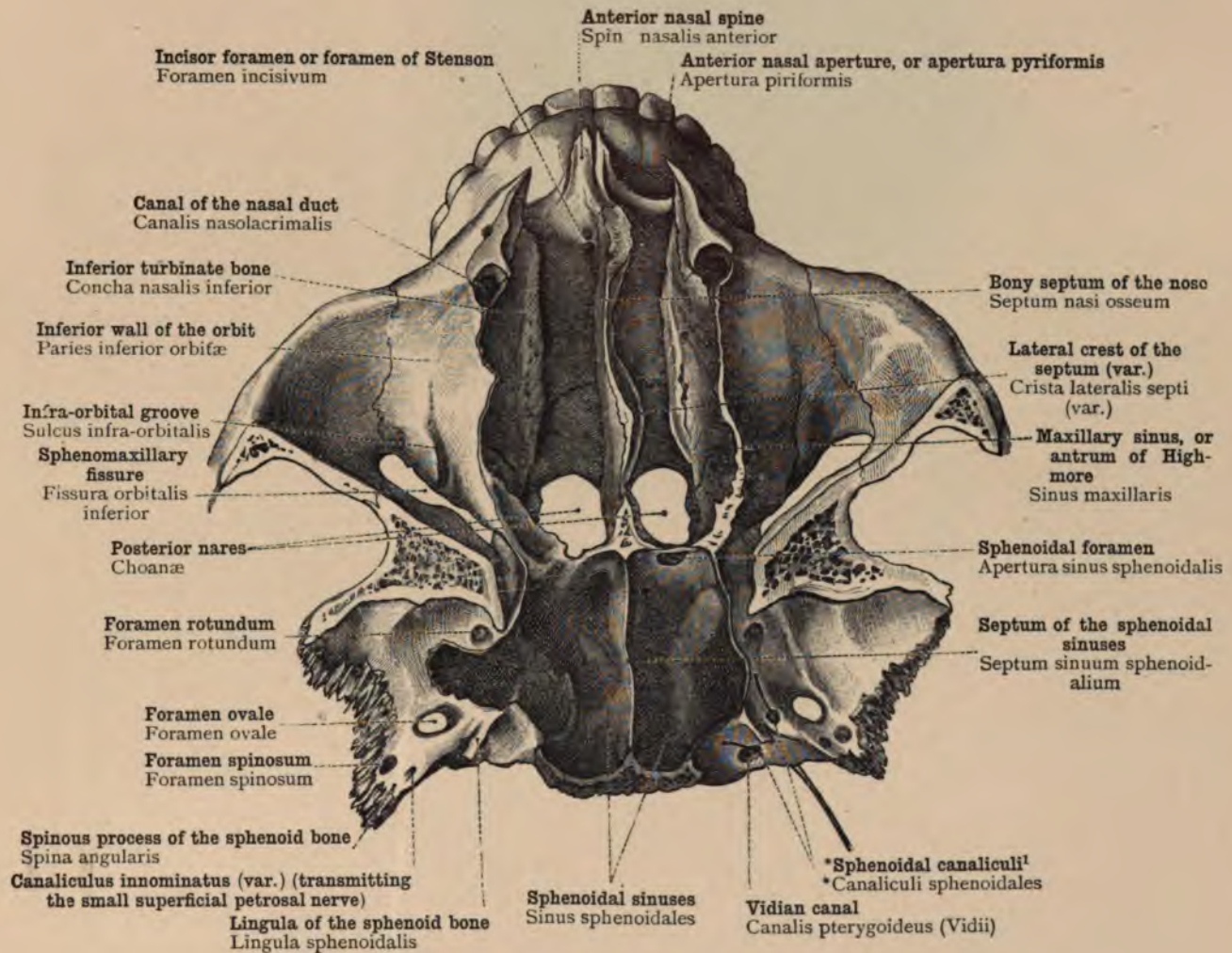


¹ I am indebted to Professor Toldt for the following account of the *Sphenoidal canaliculus, which is accurately described neither by Quain nor by Macalister: "It begins in the scaphoid fossa and divides as it ascends into two branches, the inner of which opens into the Vidian canal, while the outer opens on the cerebral surface of the great wing of the sphenoid bone, between the lingula of the sphenoid bone and the foramen ovale." The outer branch is termed by English anatomists the *foramen of Vesalius*, and transmits an emissary vein: the inner branch gives passage to the *sphenoidal branch* of the otic ganglion, by means of which this ganglion communicates with the Vidian nerve.—Tr.

FIG. 207.—BY MEANS OF A NEARLY HORIZONTAL SECTION PASSING THROUGH THE CENTRE OF THE ENTRANCE TO THE ORBIT, THE UPPER PARTS OF THE NASAL FOSSÆ AND OF THE ORBITS ARE DISPLAYED. SEEN FROM BELOW.

Posteriorly the section passes through the body of the sphenoid bone and the root of the pterygoid process, opening up the Vidian canal through its whole length.

Cavum nasi et orbita—The nasal fossæ and the orbits.



¹ See note to p. 92.

FIG. 208.—BY MEANS OF A NEARLY HORIZONTAL SECTION IN A PLANE A LITTLE ABOVE THAT OF THE INFERIOR WALLS OF THE ORBITS, THE LOWER PORTIONS OF THE NASAL FOSSÆ AND OF THE ORBITS HAVE BEEN EXPOSED.

Posteriorly the section passes through the sphenoidal sinuses, in this specimen exceptionally capacious.

Cavum nasi et orbita—Nasal cavity and orbits.

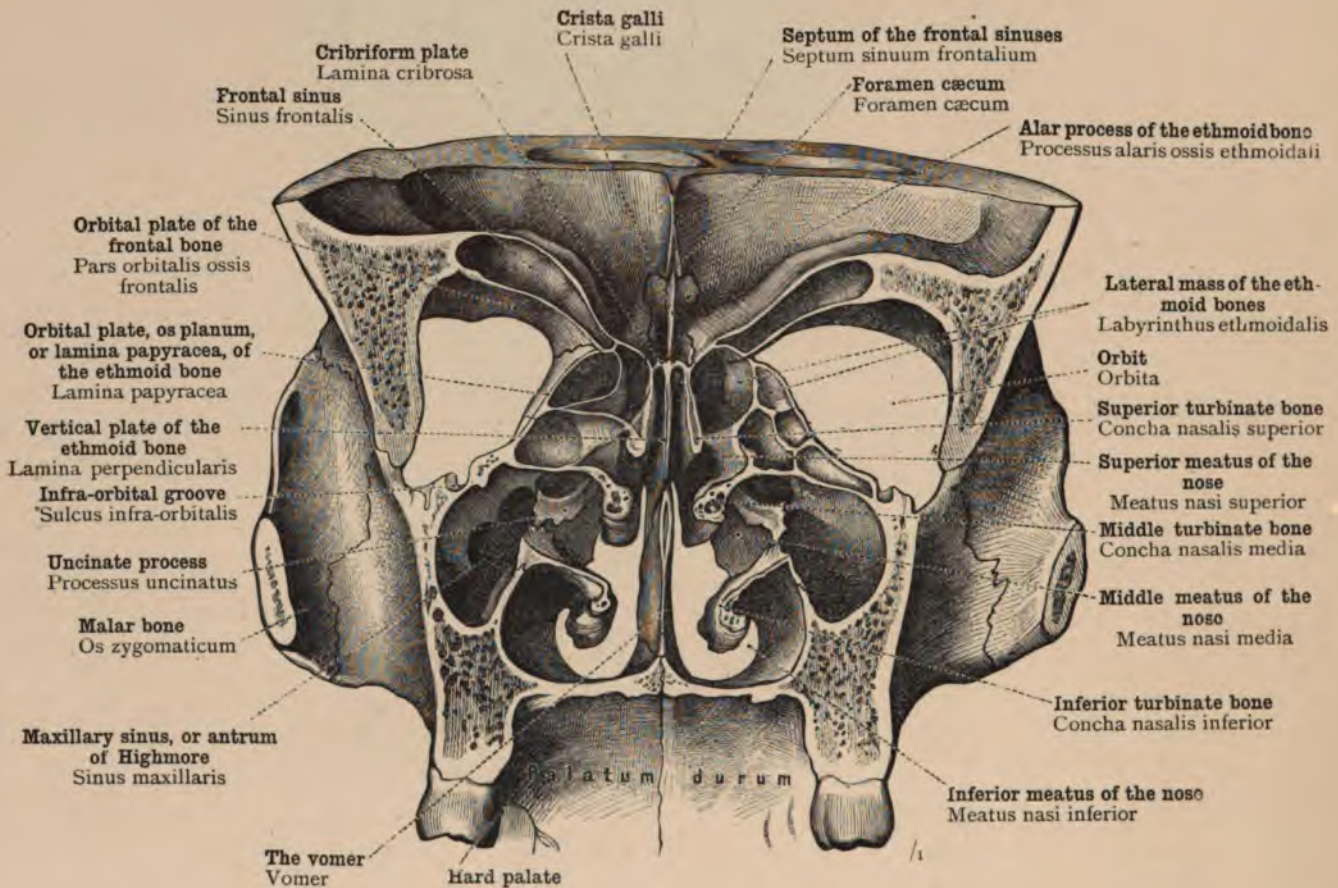


FIG. 209.—BY MEANS OF A SECTION PASSING THROUGH THE MOST ANTERIOR PORTIONS OF BOTH ZYGOMATIC ARCHES, THE NASAL CAVITY AND THE ORBITS ARE DIVIDED TOWARDS THEIR POSTERIOR EXTREMITIES IN THE FRONTAL PLANE.

The anterior portion of the skull thus divided is figured from behind. The three turbinate bones of the nose and the three nasal meatus, as well as the bony septum of the nose, are seen in frontal section. The maxillary sinuses are also opened up, and the communication of these sinuses with the general cavity of the nose is to be seen above the uncinate process.

Cavum nasi et orbita—Nasal cavity and orbits.

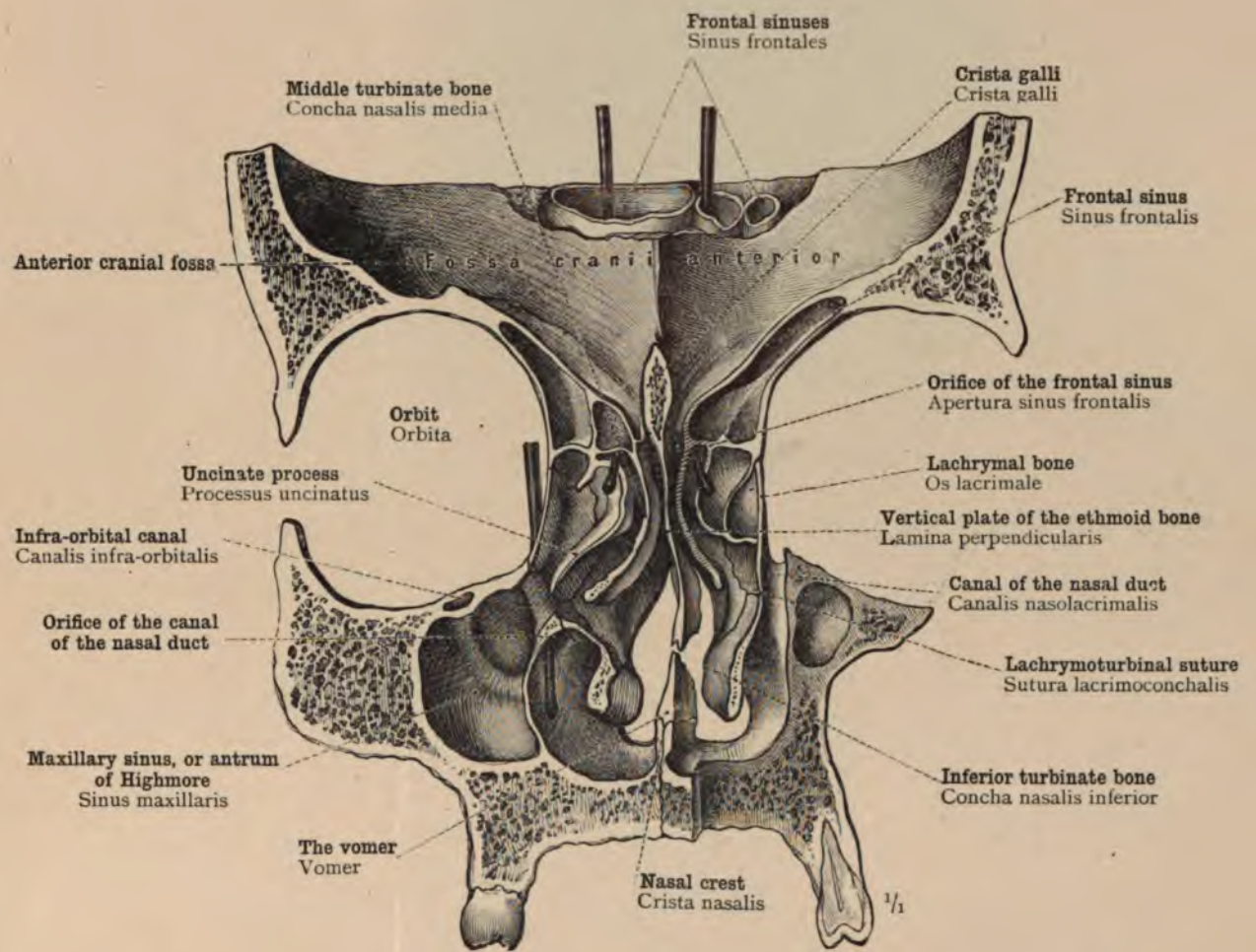
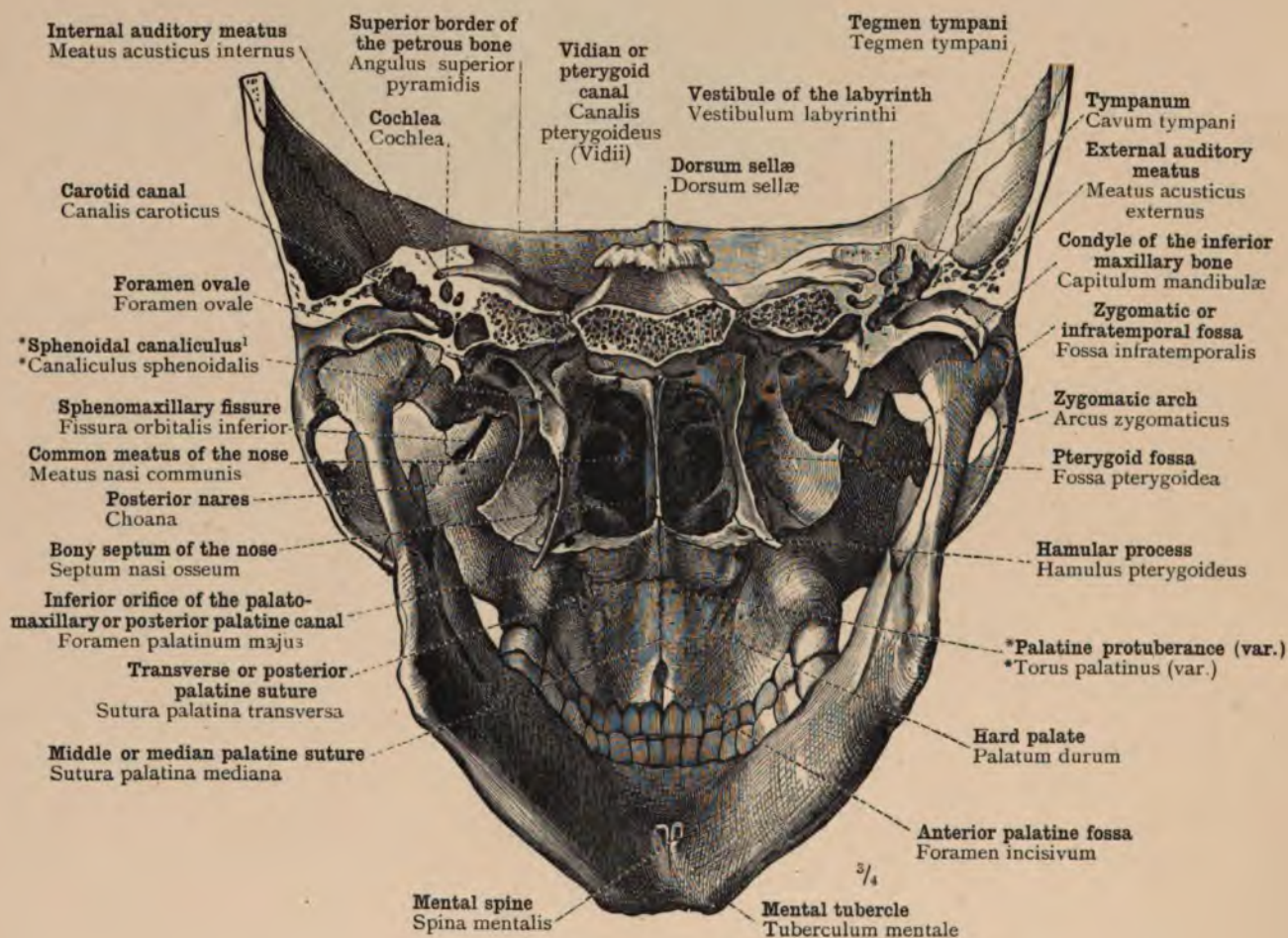


FIG. 210.—BY MEANS OF A SECTION PASSING VERTICALLY THROUGH THE POSTERIOR PORTIONS OF BOTH LACHRYMAL BONES, THE ANTERIOR PORTION OF THE NASAL CAVITY AND OF THE ORBITS IS DISPLAYED IN FRONTAL SECTION. SEEN FROM BEHIND.

From the right side of the anterior portion of the skull thus divided, a layer of bone a quarter of an inch in thickness has been removed by a section in a plane parallel with the first section, so as to open up the canal of the nasal duct, canalis nasolacrimalis, in its entire length. The sounds passed into the two frontal sinuses indicate the orifices of these sinuses in the nasal fossæ. A third sound has been passed through the left canal of the nasal duct from the orbit into the nasal cavity.

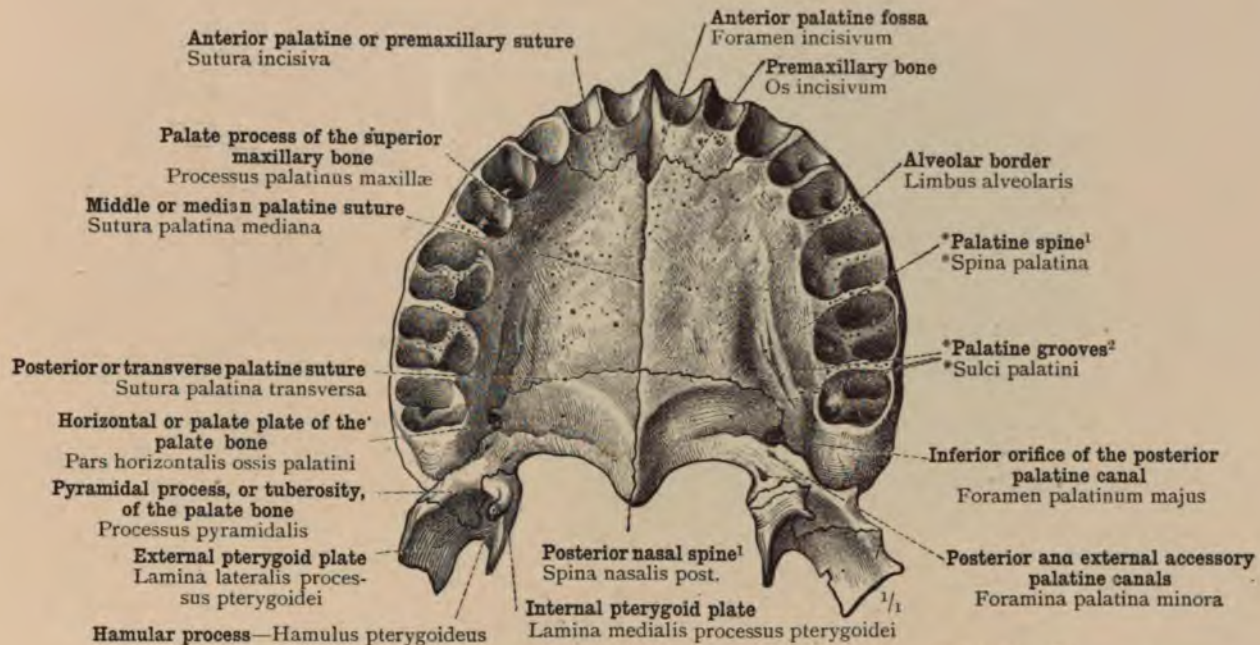
Cavum nasi et orbita—Nasal cavity and orbits.



¹ See note to p. 92.

FIG. 211.—ANTERIOR PORTION OF THE SKULL, SEPARATED FROM THE POSTERIOR PORTION BY A FRONTAL SECTION PASSING THROUGH THE TWO EXTERNAL AUDITORY MEATUS.

The view from behind shows the posterior nares with the posterior border of the bony septum of the nose, the bony framework of the oral cavity, and the zygomatic fossae; further, in frontal section, the tympanic cavities, with portions of the bony labyrinths and the internal auditory meatus.



¹ In the English nomenclature *palatine spine* is an alternative name for the *posterior nasal spine*.—Tr.

² The English nomenclature recognises one *palatine groove* only, that running forwards on the under surface of the hard palate from the inferior orifice of the posterior palatine canal, lodging the large palatine nerve and vessels.—Tr.

FIG. 212.—THE HARD PALATE, PALATUM DURUM, WITH THE ALVEOLAR PROCESS OF THE SUPERIOR MAXILLARY BONE, REMOVED BY A SECTION PASSING HORIZONTALLY THROUGH BOTH SUPERIOR MAXILLARY BONES ABOVE THE FLOOR OF THE NASAL FOSSÆ. SEEN FROM BELOW.

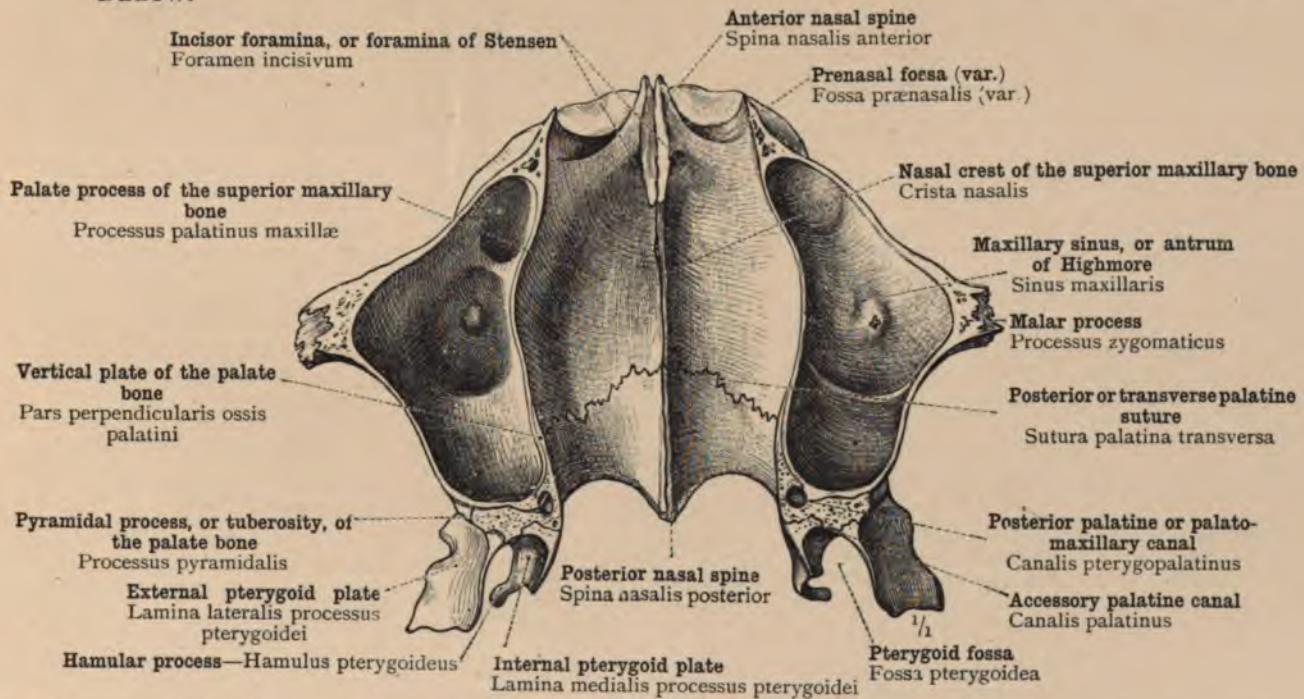


FIG. 213.—THE FLOOR (INFERIOR WALL) OF THE NASAL FOSSÆ WITH THE MAXILLARY SINUSES LYING ON EITHER SIDE, SHOWN BY MEANS OF A HORIZONTAL SECTION THROUGH THE SUPERIOR MAXILLARY BONES. SEEN FROM ABOVE.

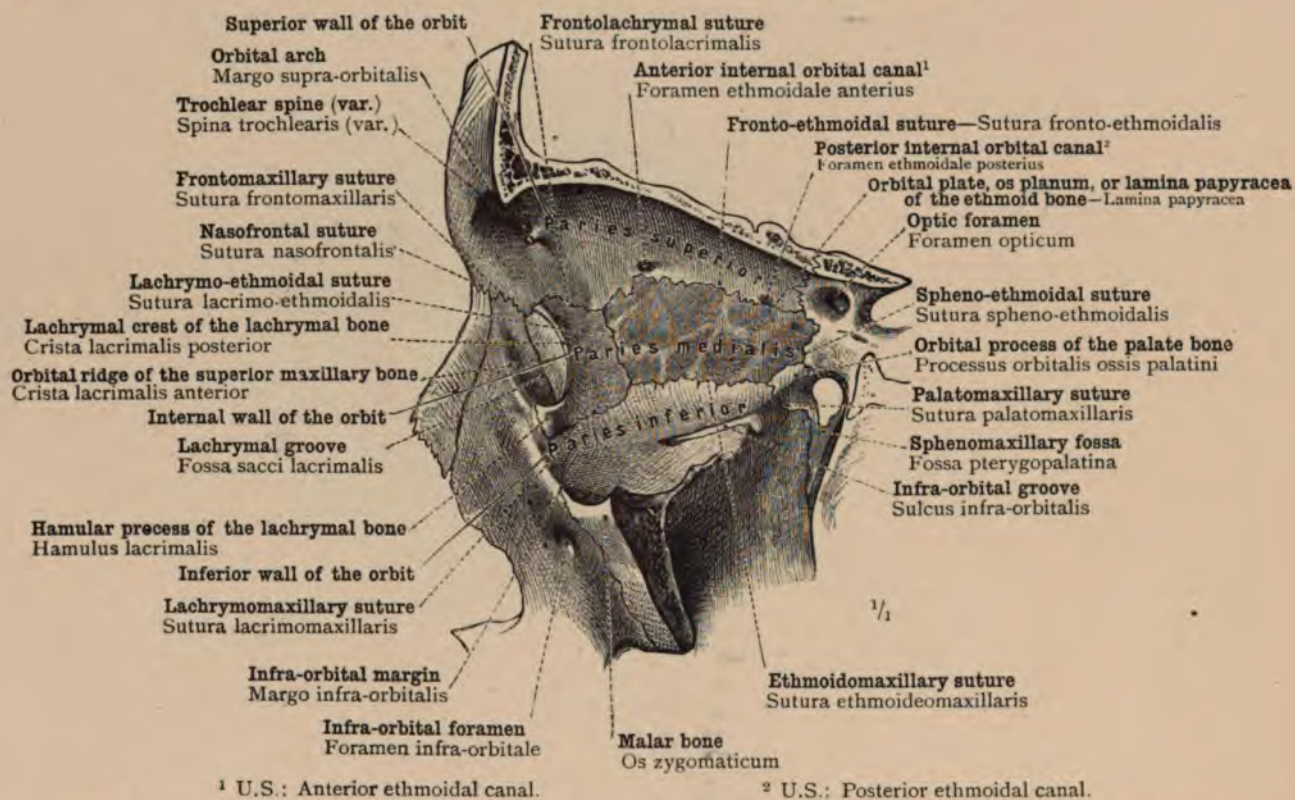


FIG. 214.—INTERNAL PORTION OF THE LEFT ORBIT, SHOWN BY THE REMOVAL OF THE EXTERNAL WALL. SEEN FROM THE LEFT SIDE.

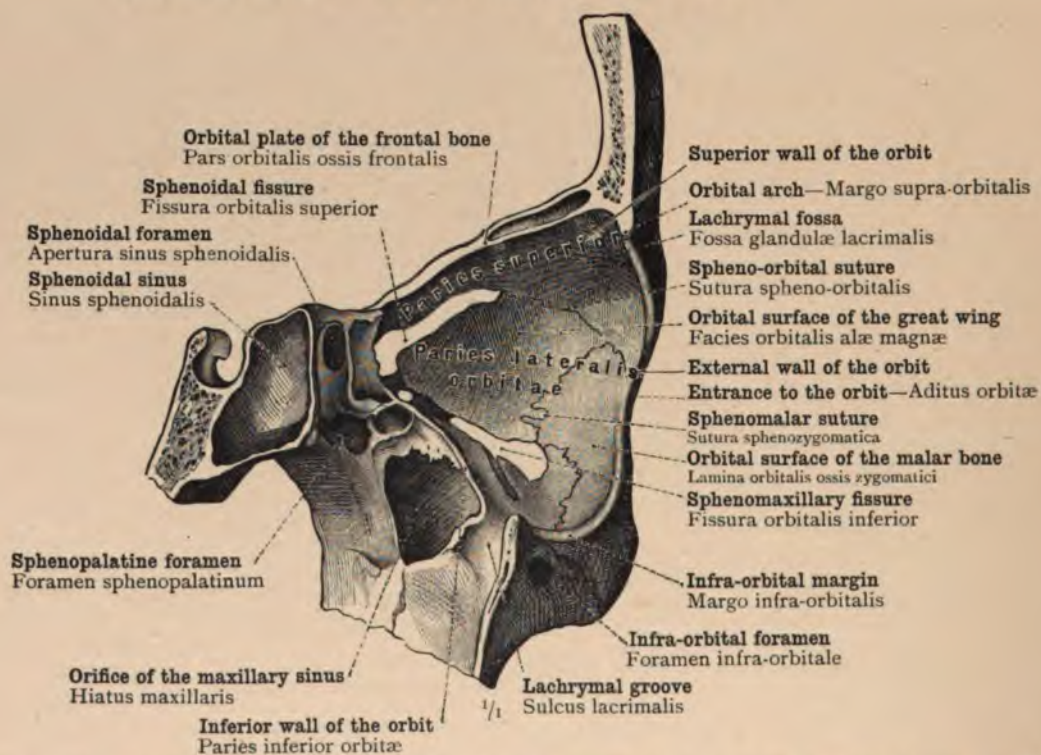


FIG. 215.—EXTERNAL PORTION OF THE LEFT ORBIT, SHOWN BY THE REMOVAL OF THE INTERNAL WALL OF THE ORBIT AND OF A PORTION OF THE SUPERIOR MAXILLARY BONE IN A LONGITUDINALLY HEMISECTED SKULL.

Orbita—The orbits.

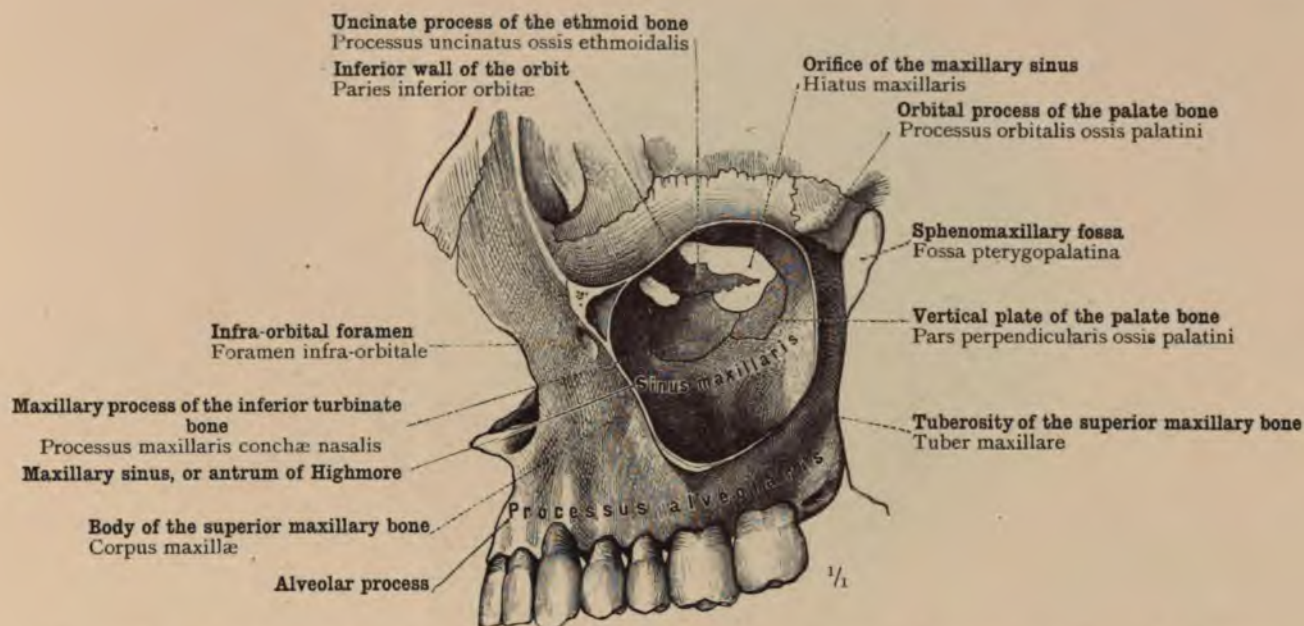
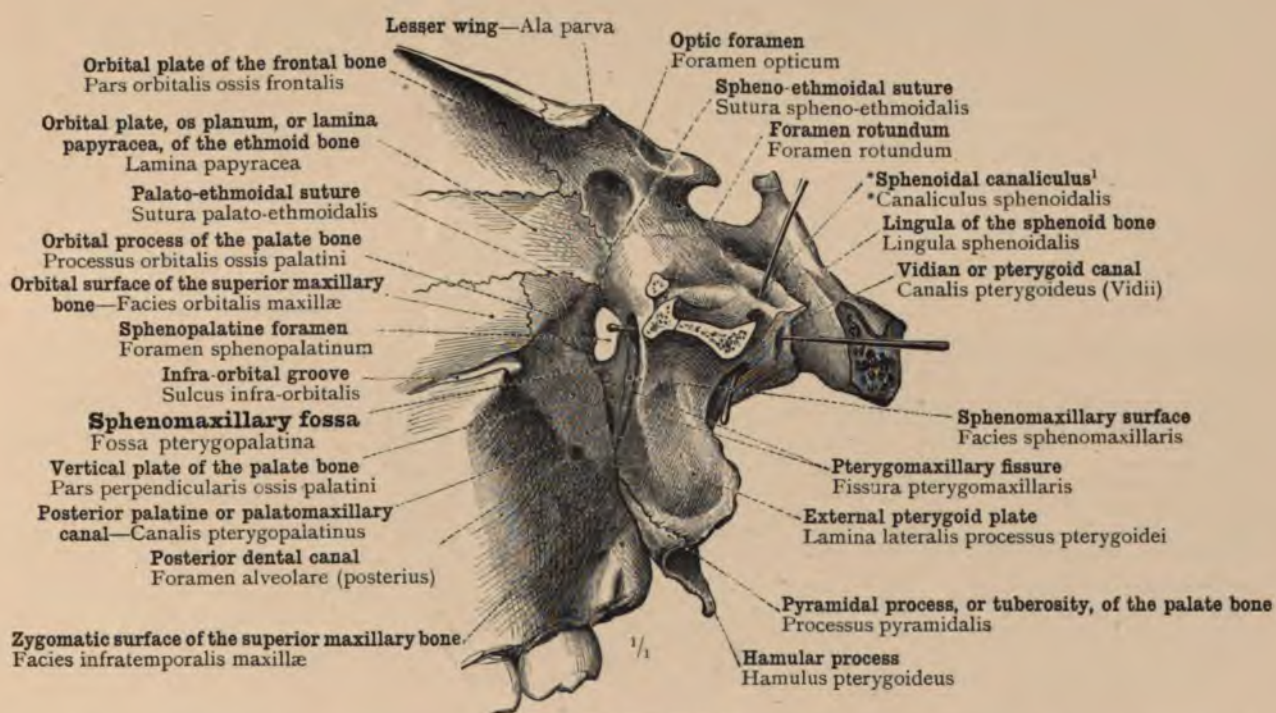


FIG. 216.—THE LEFT MAXILLARY SINUS, OR ANTRUM OF HIGHMORE, SHOWN BY THE REMOVAL OF THE EXTERNAL WALL OF THE BODY OF THE SUPERIOR MAXILLARY BONE AND THE MALAR BONE. SEEN FROM THE LEFT SIDE.



¹ See note to p. 92.

FIG. 217.—THE LEFT SPHENOMAXILLARY FOSSA, SHOWN BY REMOVAL OF THE MALAR BONE, THE TEMPORAL BONE, AND THE GREAT WING OF THE SPHENOID BONE. SEEN FROM THE LEFT SIDE.

Sinus maxillaris—Maxillary sinus, or antrum of Highmore.—Fossa pterygopalatina—Sphenomaxillary fossa.

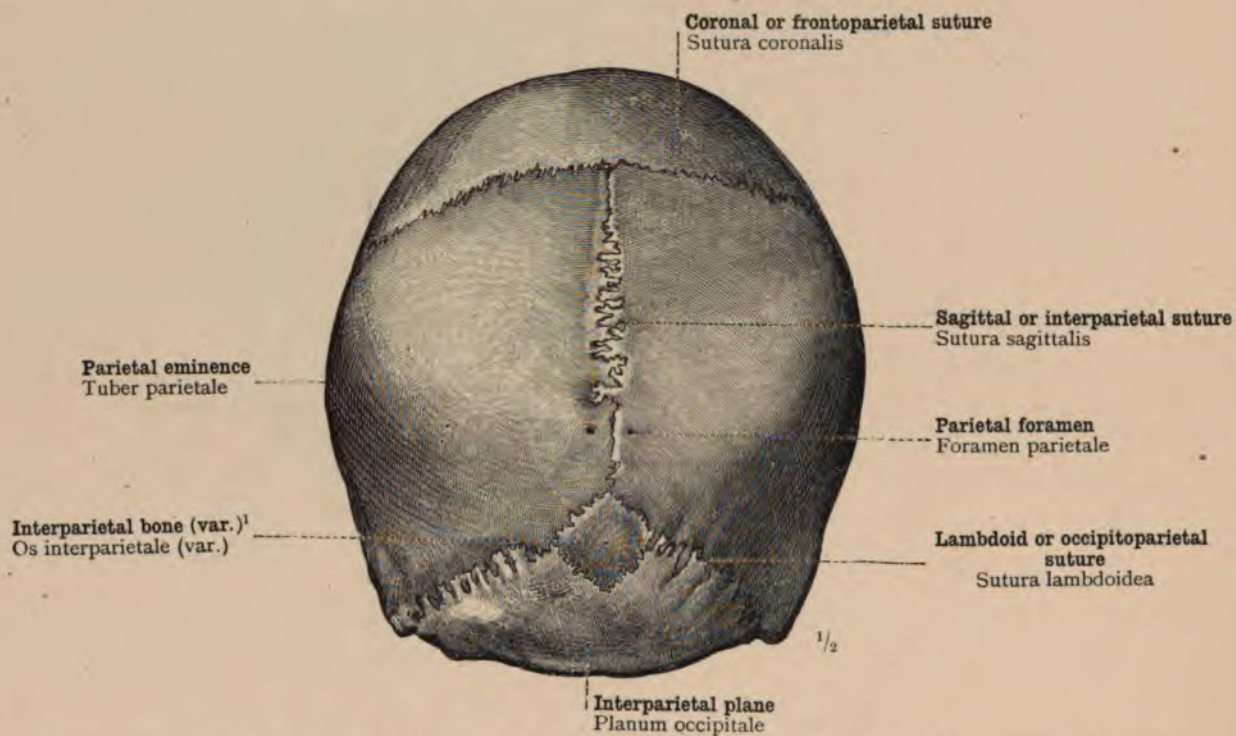


FIG. 218.—A LARGE WORMIAN BONE IN THE UPPERMOST PART OF THE LAMBDOID SUTURE.

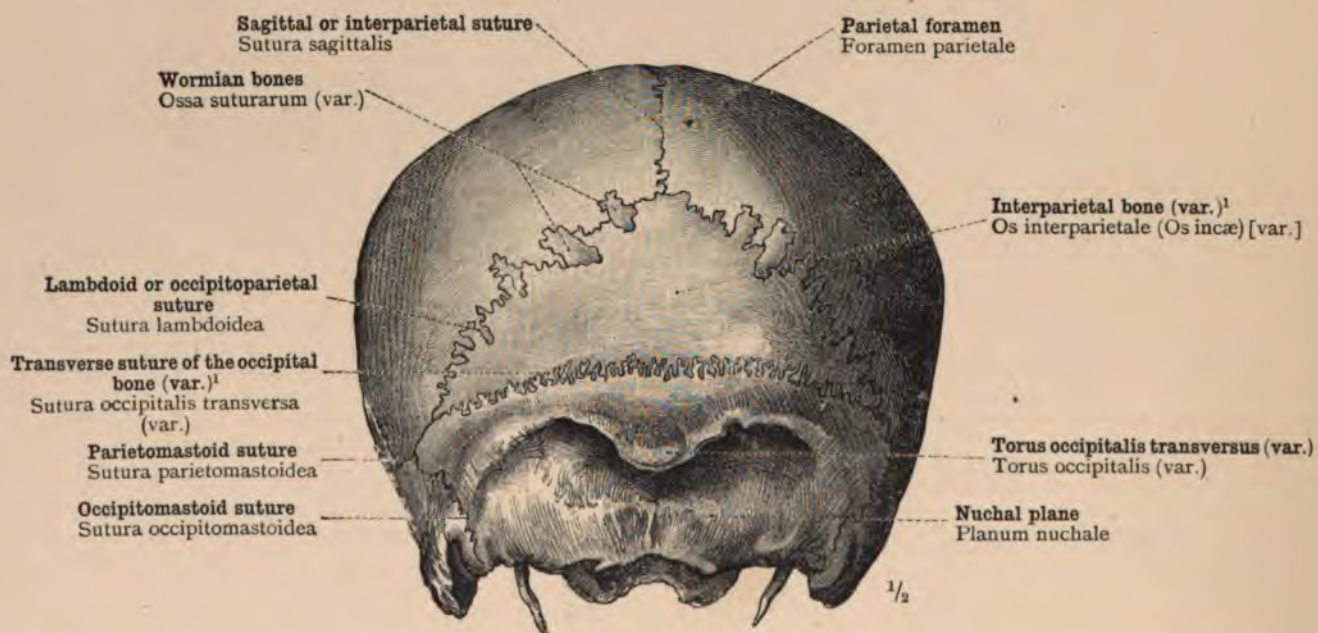


FIG. 219.—SEVERAL WORMIAN BONES IN THE LAMBDOID SUTURE.—AN INTERPARIETAL BONE.

¹ See note to p. 57.

Ossa suturarum—Wormian bones.

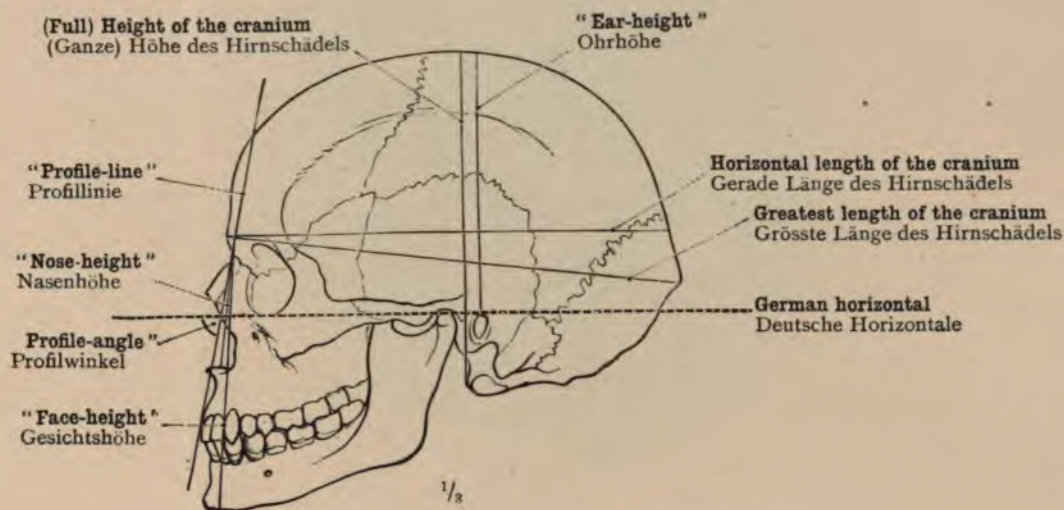


FIG. 220.—SIDE-VIEW OF THE SKULL: NORMA LATERALIS.

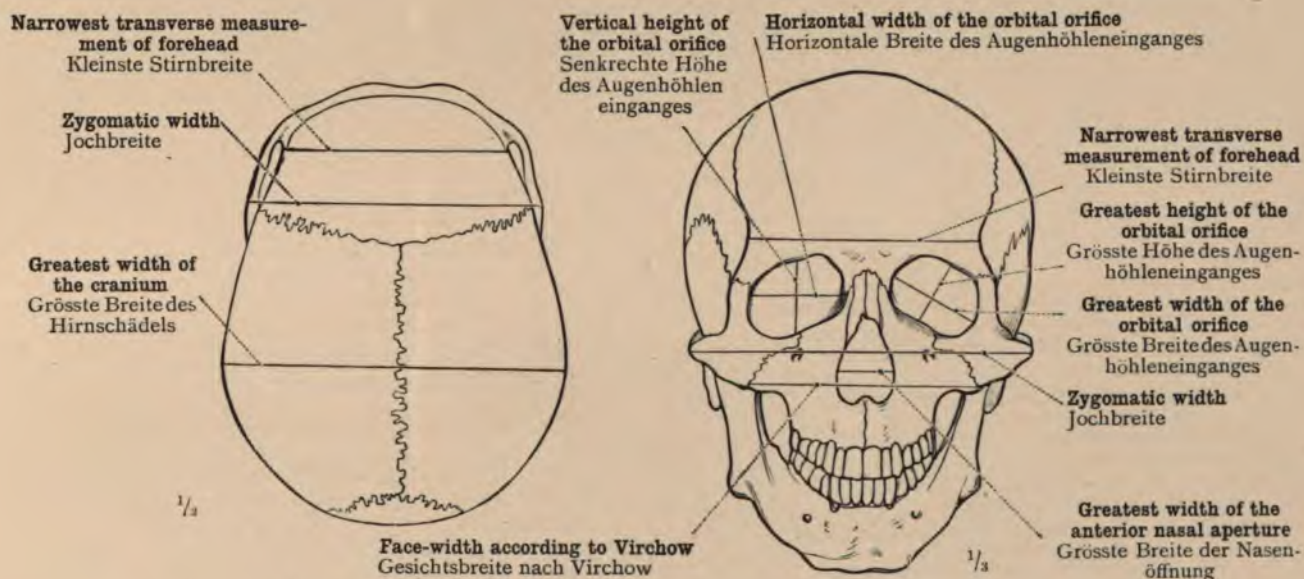


FIG. 221.—SKULL SEEN FROM ABOVE
NORMA VERTICALIS.

FIG. 222.—FRONT VIEW OF THE SKULL:
NORMA FRONTALIS.

TRANSLATOR'S NOTE.—The above measurements do not fully correspond with those used by English craniologists. For this reason a purely literal translation of the German terms has been given.

The Principal Measurements of the Skull.

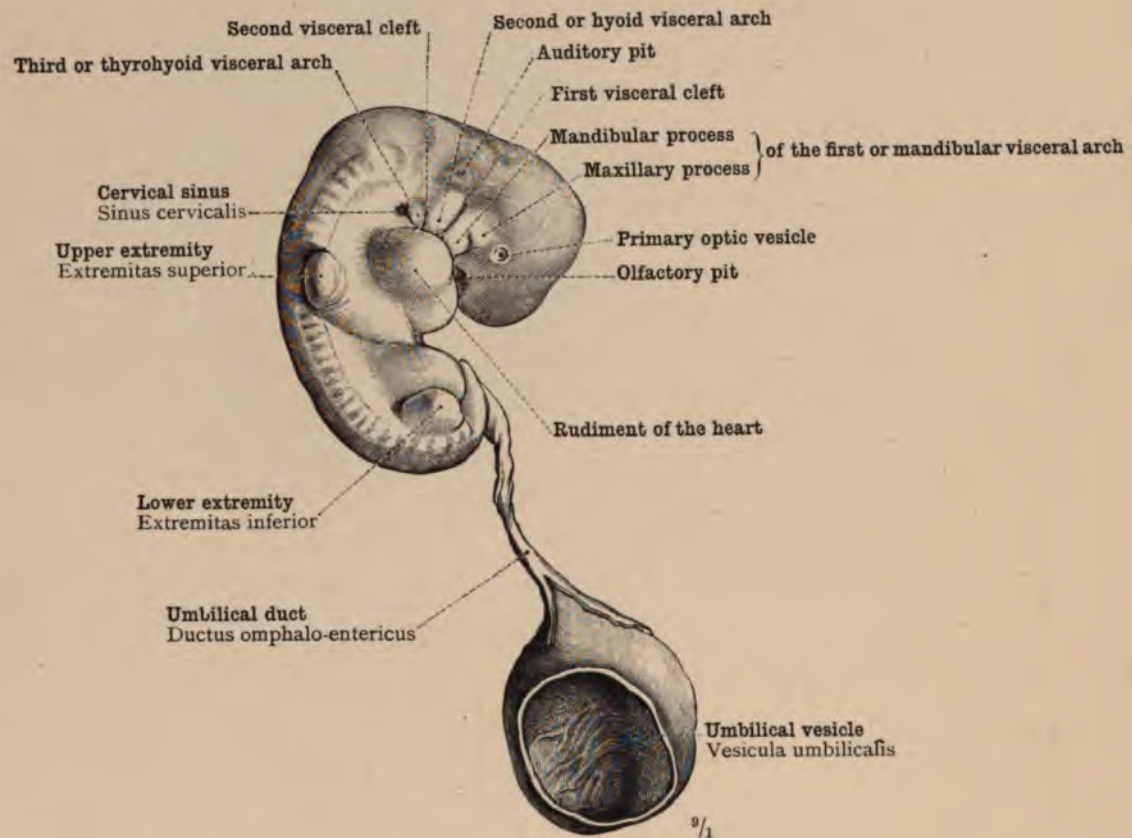
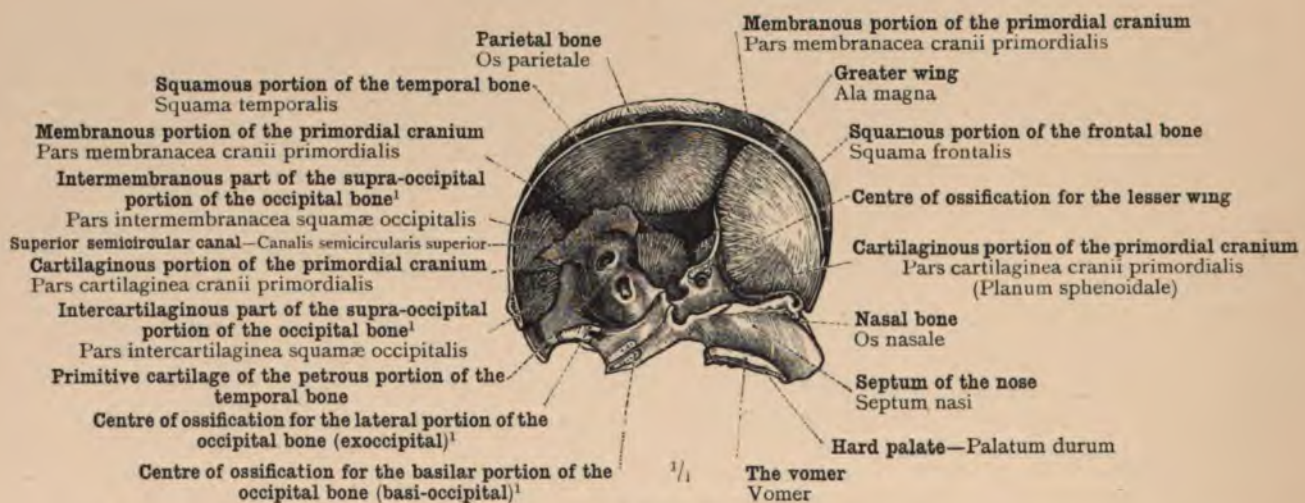


FIG. 223.—HUMAN EMBRYO, FOUR WEEKS OLD.
The umbilical vesicle has been opened.



¹ See note to p. 57.

FIG. 224.—THE LEFT HALF OF THE SKULL OF A HUMAN FŒTUS AT THE END OF THE FOURTH MONTH (MONTHS OF FOUR WEEKS EACH). SEEN FROM WITHIN.
Body-length, $4\frac{1}{2}$ inches.

Development of the Skull.

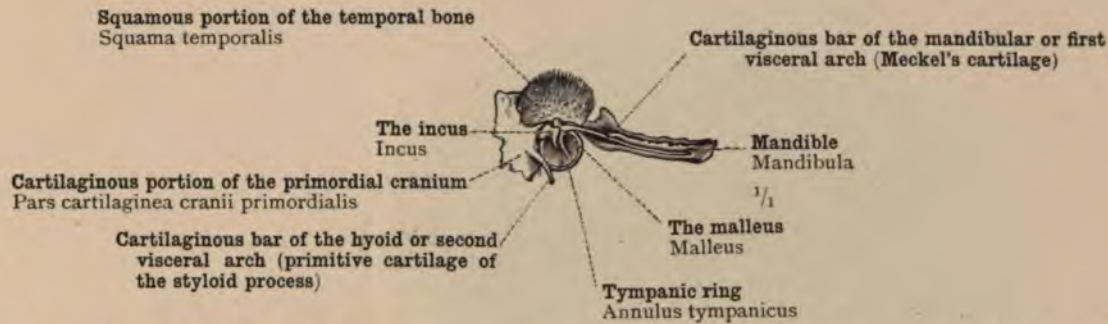
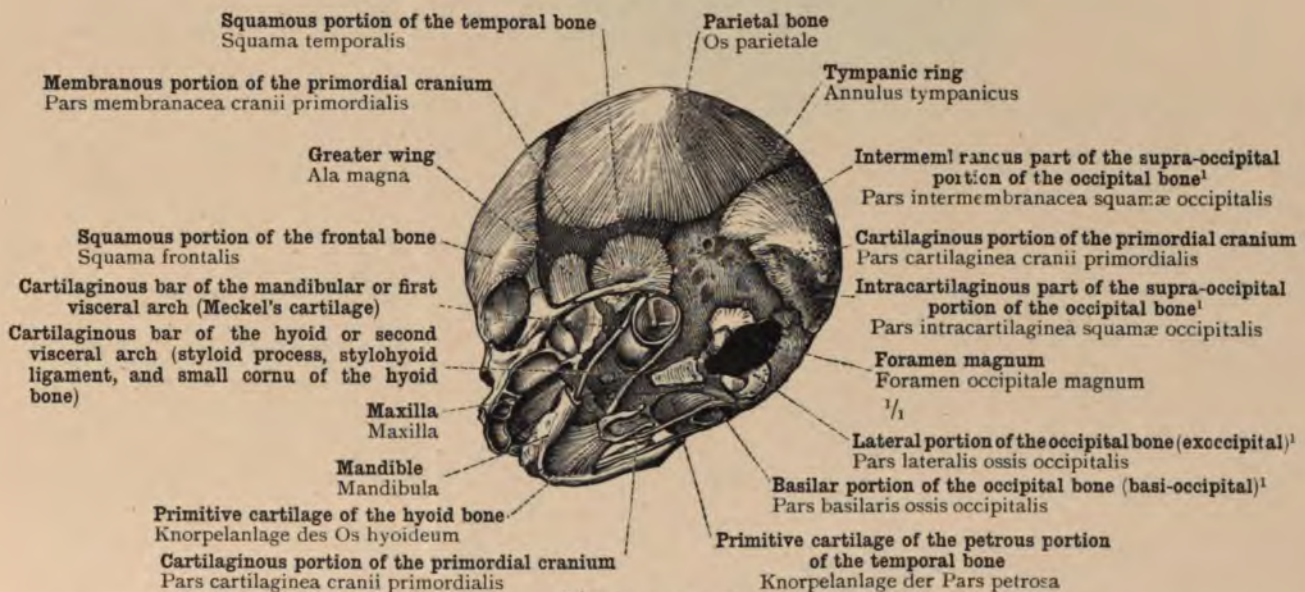


FIG. 225.—THE SQUAMOUS PORTION OF THE TEMPORAL BONE, THE TYMPANIC MEMBRANE WITH THE MALLEUS, THE INCUS, AND MECKEL'S CARTILAGE, FROM A HUMAN FÆTUS IN THE FIRST HALF OF THE FIFTH MONTH (MONTHS OF FOUR WEEKS EACH). SEEN FROM WITHIN.

Body-length, $5\frac{1}{2}$ inches.



¹ See note to p. 57.

FIG. 226.—THE SKULL OF A HUMAN FÆTUS IN THE MIDDLE OF THE FIFTH MONTH (MONTHS OF FOUR WEEKS EACH). SEEN FROM THE LEFT SIDE AND BELOW.

Body-length, $6\frac{1}{2}$ inches. The cartilaginous bars of the visceral arches are displayed. Part of the cartilage of the left side of the inferior maxilla has been removed in order to lay bare a portion of Meckel's cartilage which lies beneath it.



FIG. 227.—THE DRIED SKULL OF A HUMAN FÆTUS IN THE MIDDLE OF THE FOURTH MONTH (MONTHS OF FOUR WEEKS EACH).

Body-length, $3\frac{1}{2}$ inches.



FIG. 228.—THE DRIED SKULL OF A HUMAN FÆTUS AT THE END OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH).

Body-length, $11\frac{1}{2}$ inches.

Development of the Skull.

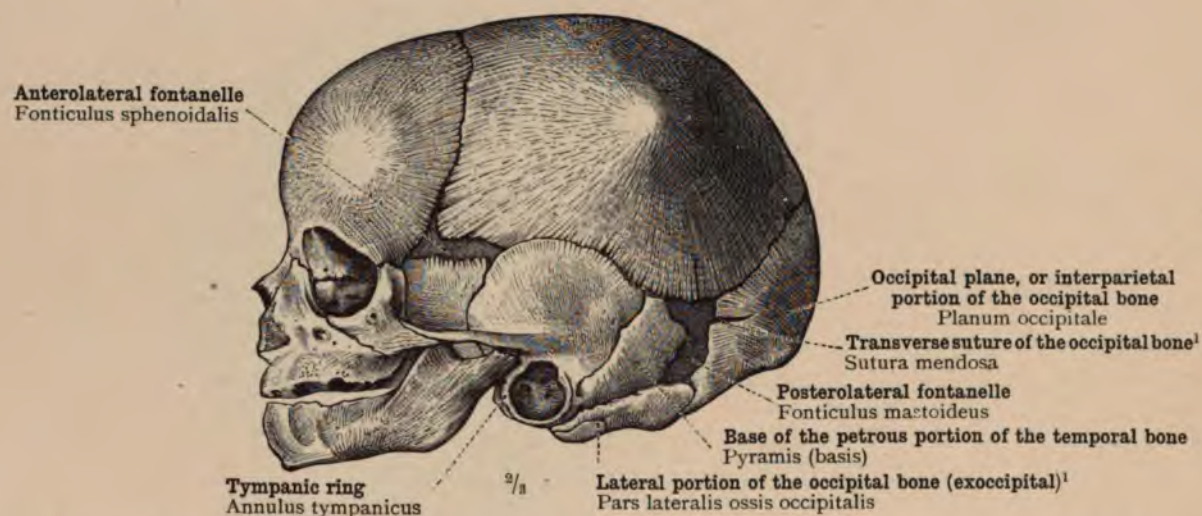


FIG. 229.—THE DRIED SKULL OF AN INFANT BORN AT FULL TERM. SEEN FROM THE LEFT SIDE.

Body-length, 20½ inches. In the anterolateral fontanelle there remains part of the membranous portion of the primordial cranium (membrane of the fontanelle); in the posterolateral fontanelle there remains part of the cartilaginous portion of the primordial cranium.

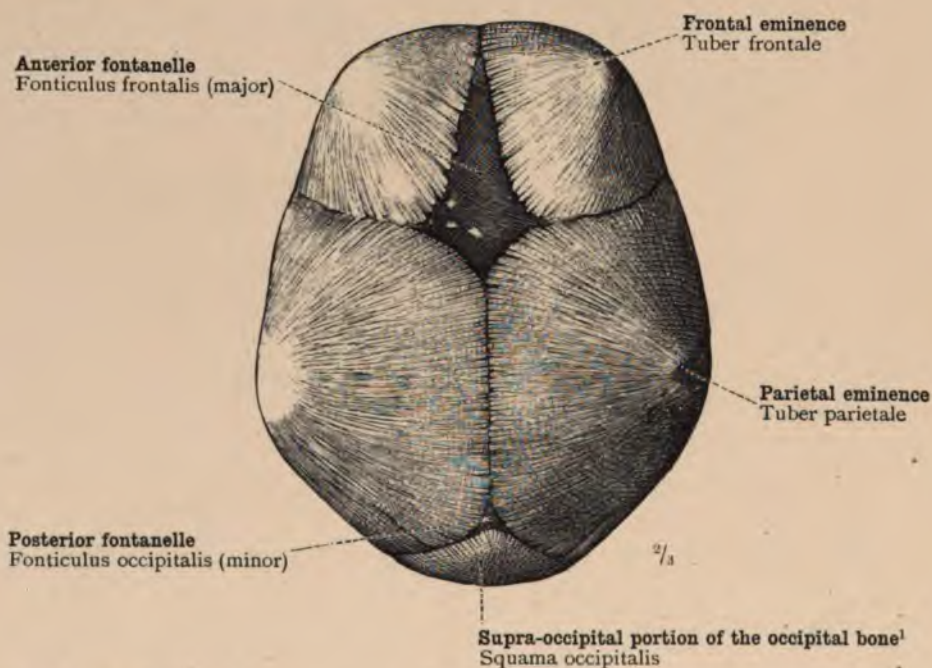


FIG. 230.—THE DRIED SKULL OF AN INFANT BORN AT FULL TERM. SEEN FROM ABOVE.

Body-length, 20½ inches. In the anterior and in the posterior fontanelle there remain parts of the membranous portion of the primordial cranium.

¹ See note to p. 57.

SKELETON EXTREMITATUM,
SUPERIORIS ET INFERIORIS

THE SKELETON OF THE UPPER
AND LOWER EXTREMITIES
(THE APPENDICULAR SKELETON)

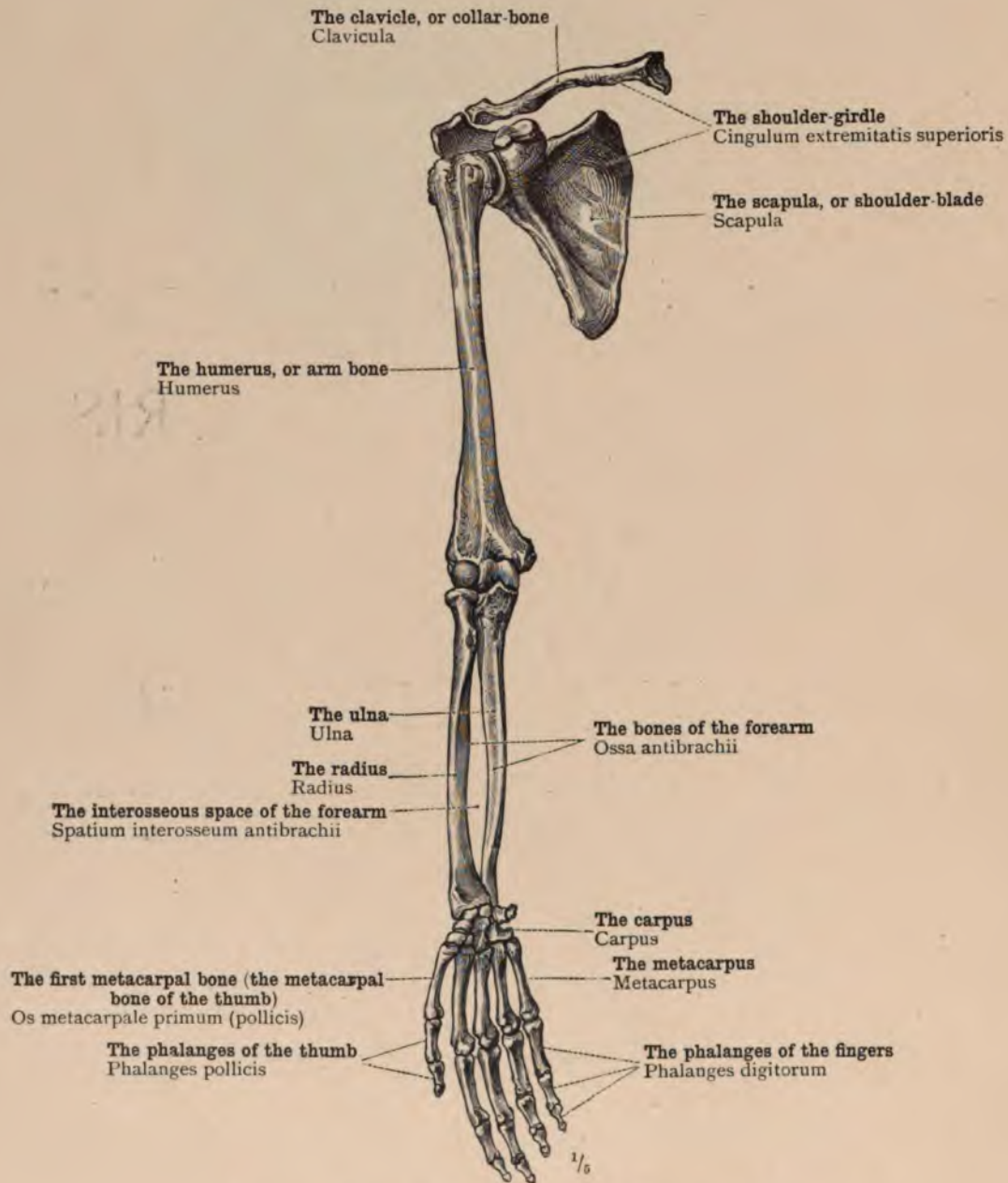


FIG. 231.—THE SKELETON OF THE UPPER EXTREMITY.

Skeleton extremitatis superioris—The skeleton of the upper extremity.

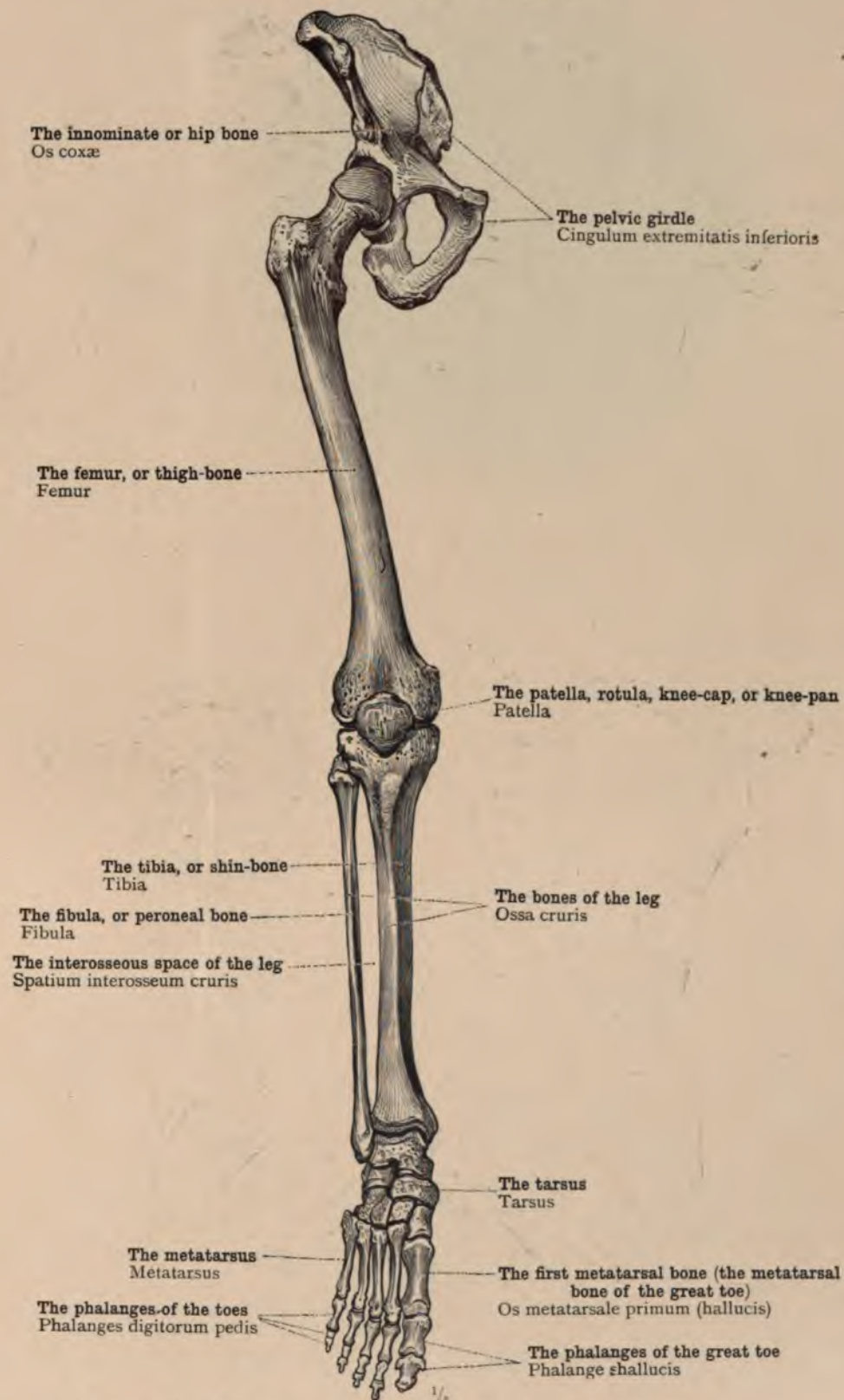


FIG. 232.—THE SKELETON OF THE LOWER EXTREMITY.

Skeleton extremitatis inferioris—The skeleton of the lower extremity.

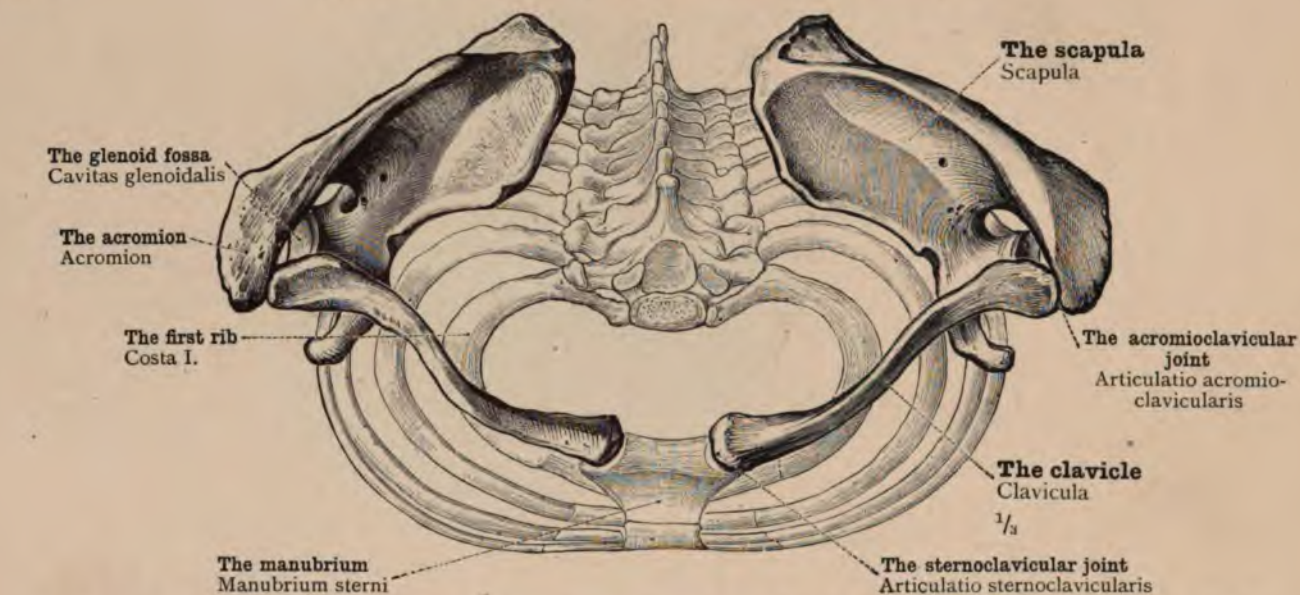


FIG. 233.—THE SHOULDER-GIRDLE AND ITS RELATION TO THE THORAX. SEEN FROM ABOVE.

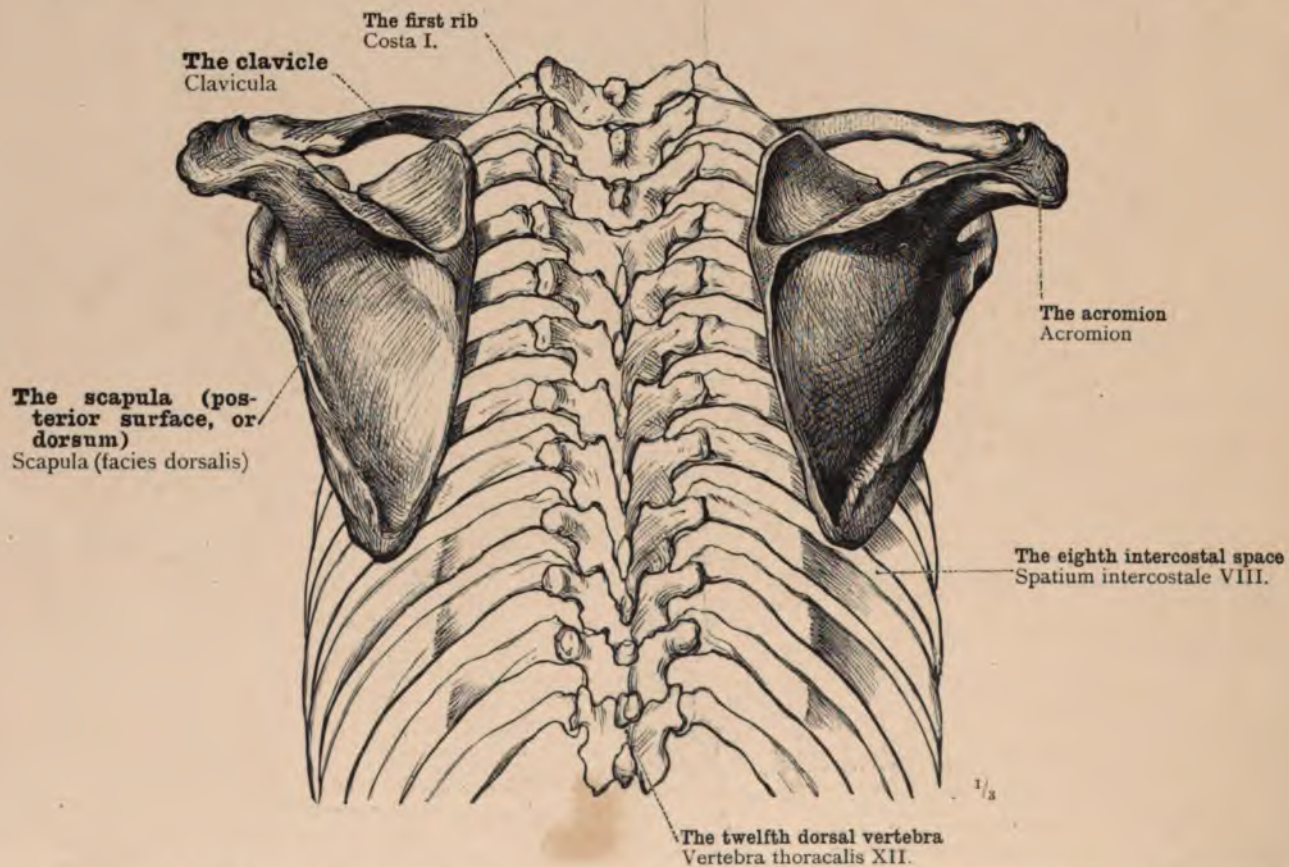


FIG. 234.—THE SHOULDER-GIRDLE AND ITS RELATION TO THE THORAX. SEEN FROM BEHIND.

Cingulum extremitatis superioris—The shoulder-girdle.



FIG. 235.—THE RIGHT CLAVICLE SEEN FROM ABOVE.



FIG. 236.—THE RIGHT CLAVICLE SEEN FROM BELOW.

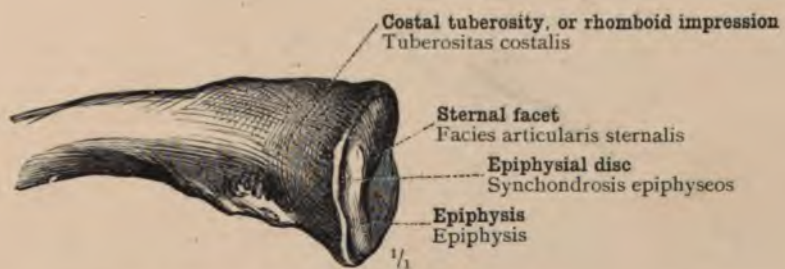


FIG. 237.—STERNAL EXTREMITY OF THE RIGHT CLAVICLE OF A FEMALE AGED TWENTY YEARS, WITH A STERNAL EPIPHYSIS. SEEN FROM BEFORE.

Clavicula—The clavicle.

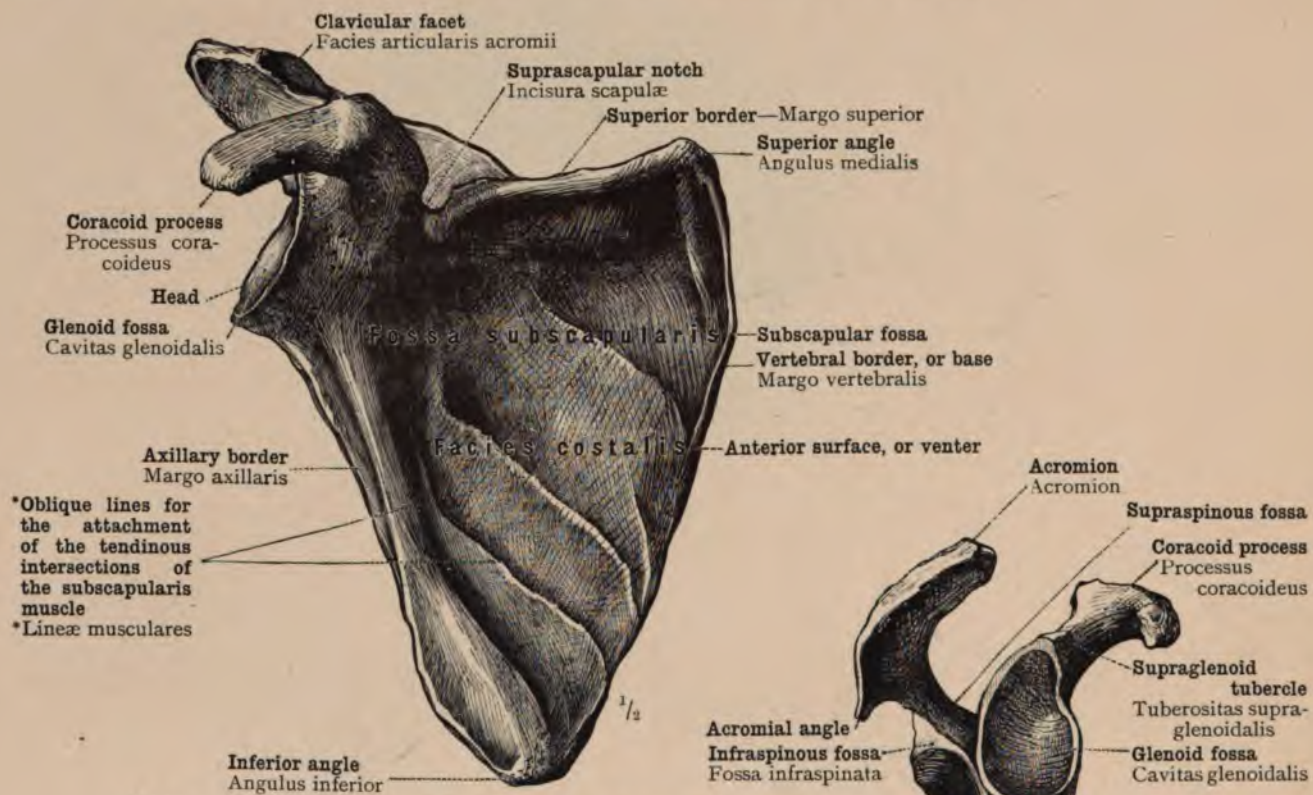


FIG. 238.—THE RIGHT SCAPULA SEEN FROM BEFORE.

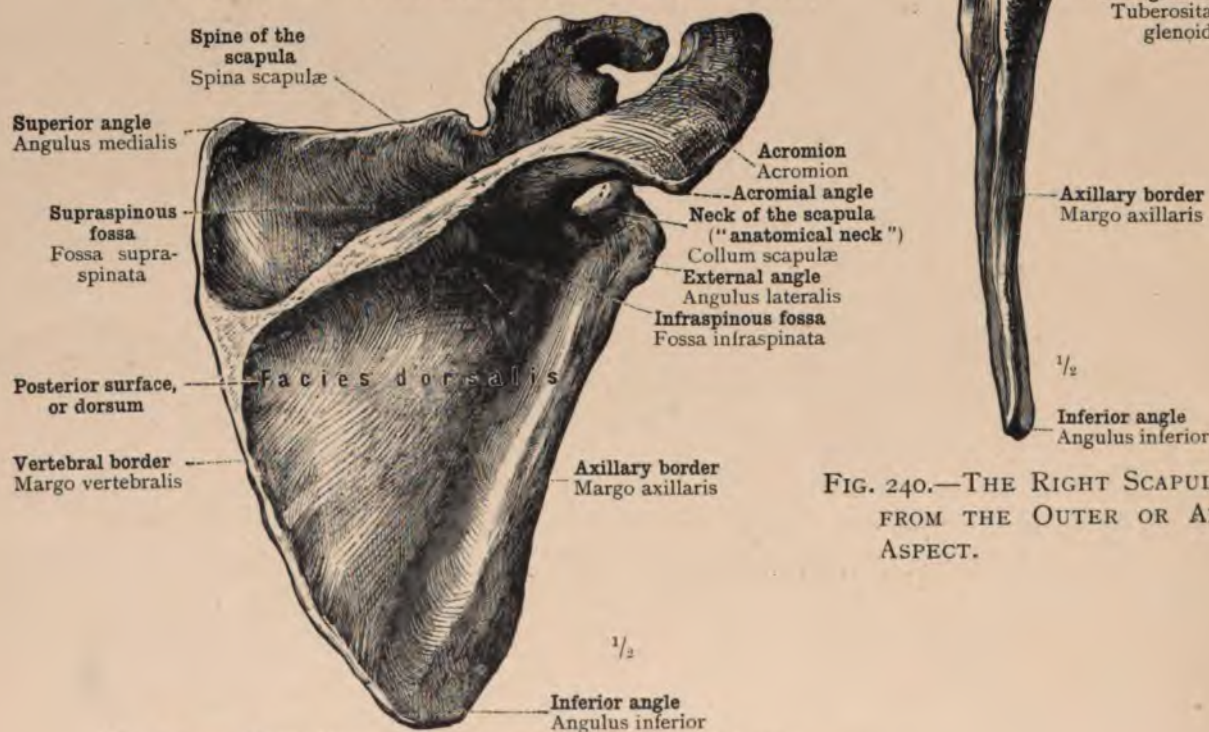


FIG. 239.—THE RIGHT SCAPULA SEEN FROM BEHIND.

FIG. 240.—THE RIGHT SCAPULA SEEN FROM THE OUTER OR AXILLARY ASPECT.

Scapula—The shoulder-blade.

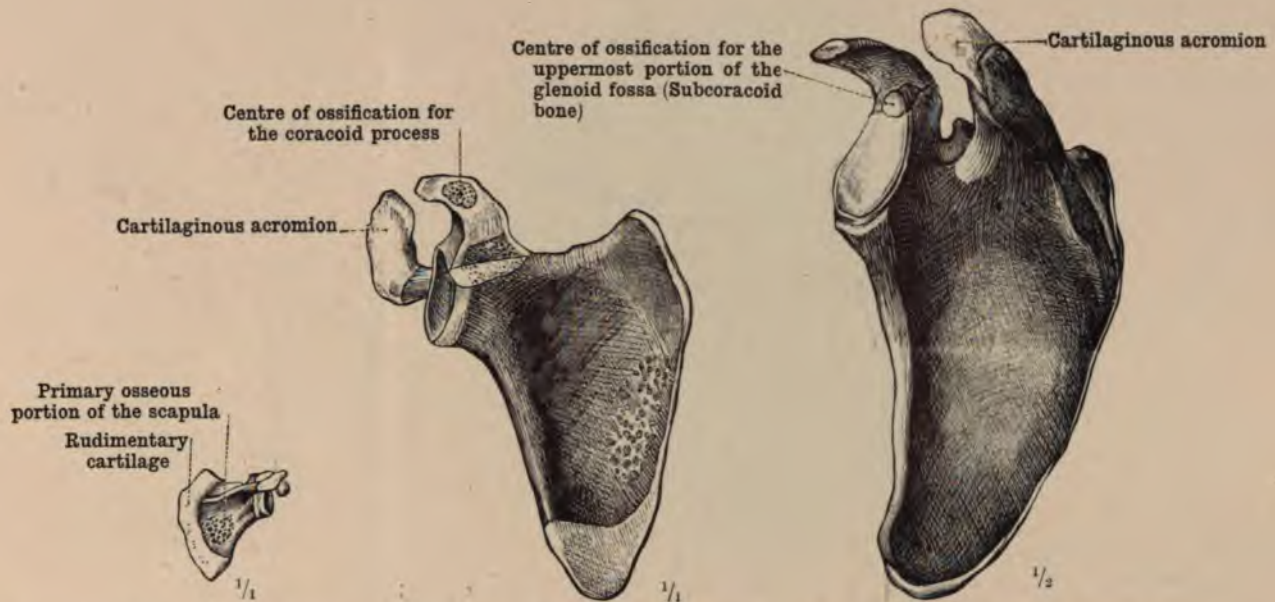


FIG. 241.—IN THE FIFTH MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH).

FIG. 242.—IN THE SECOND YEAR OF LIFE.

FIG. 243.—IN THE FIFTEENTH YEAR OF LIFE.

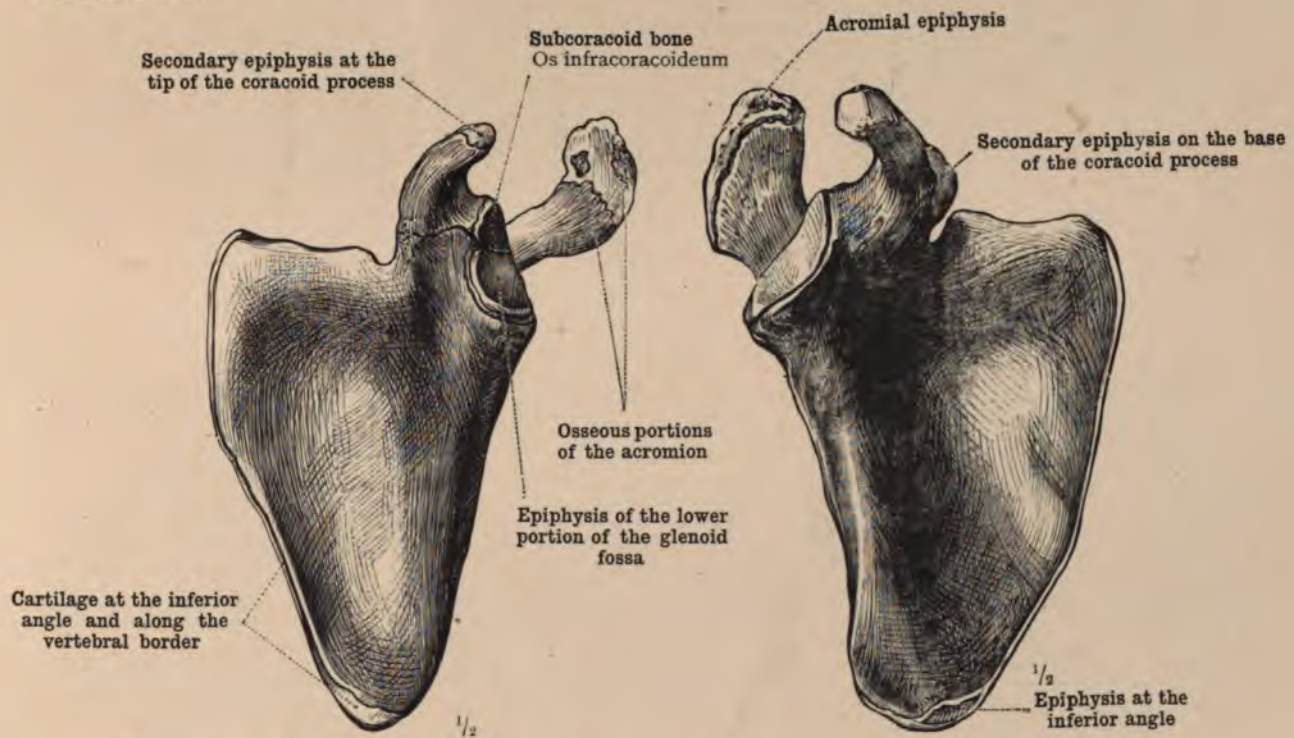
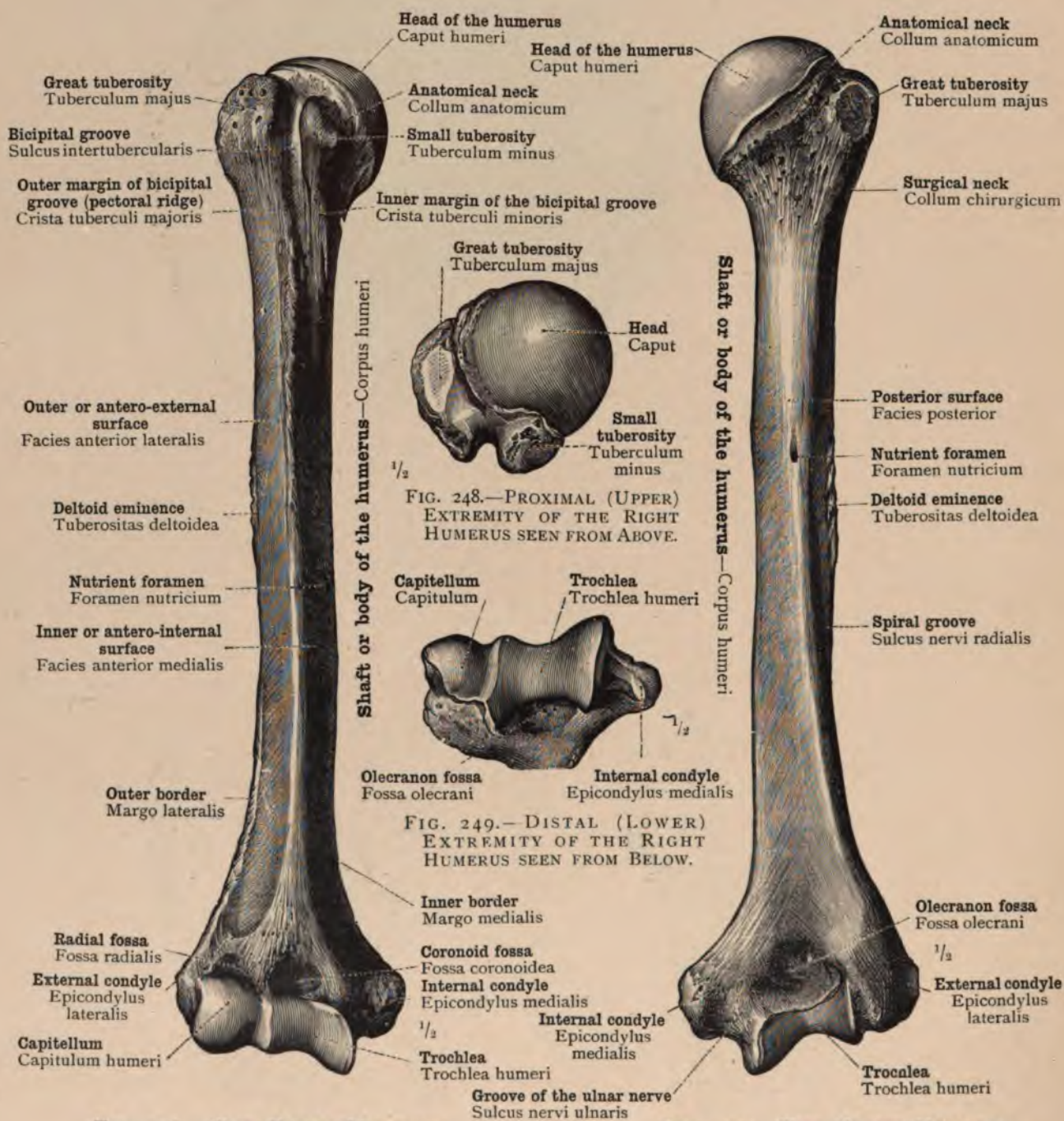


FIG. 244.—IN THE SEVENTEENTH YEAR OF LIFE.

FIG. 245.—IN THE NINETEENTH YEAR OF LIFE.

Development of the Scapula.



Humerus—The humerus.

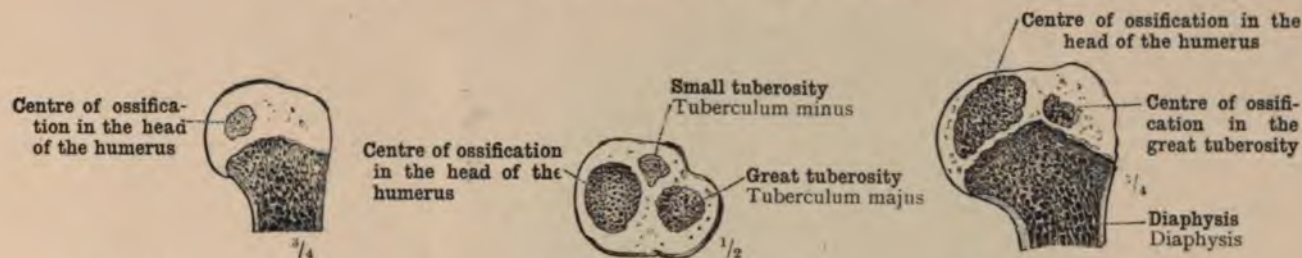


FIG. 250.—FROM A GIRL AGED FOUR MONTHS.

FIG. 252.—FROM A BOY AGED THREE YEARS (HORIZONTAL SECTION.)

FIG. 251.—FROM A BOY AGED TWO YEARS.

THE CENTRES OF OSSIFICATION OF THE PROXIMAL EXTREMITY OF THE HUMERUS.

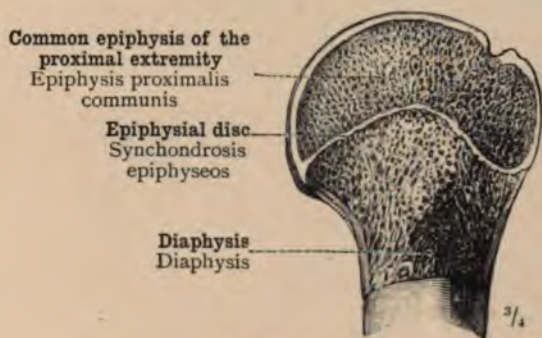


FIG. 253.—FROM A BOY AGED THIRTEEN YEARS.

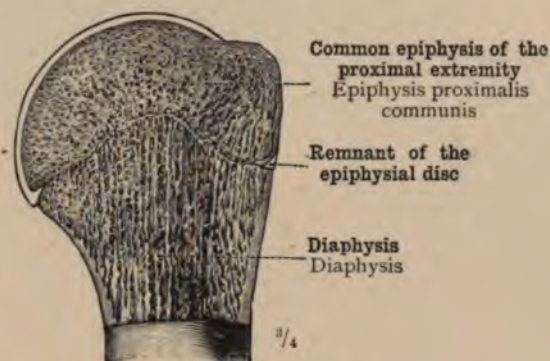


FIG. 254.—FROM A GIRL AGED NINETEEN YEARS.

THE COMMON EPIPHYSIS OF THE PROXIMAL EXTREMITY OF THE HUMERUS.



FIG. 255.—FROM A BOY AGED TWO AND A HALF YEARS.

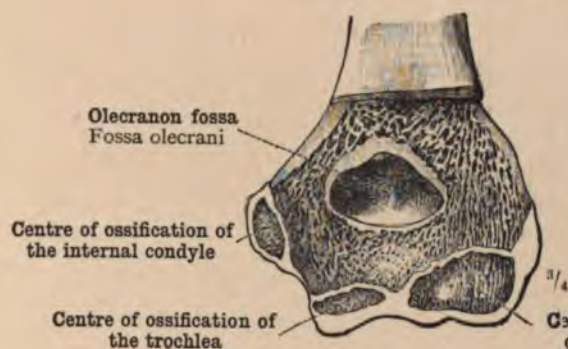


FIG. 256.—FROM A BOY AGED THIRTEEN YEARS.



FIG. 257.—FROM A BOY AGED SEVENTEEN YEARS.

THE EPIPHYSES OF THE DISTAL EXTREMITY OF THE HUMERUS.

Development of the Humerus.

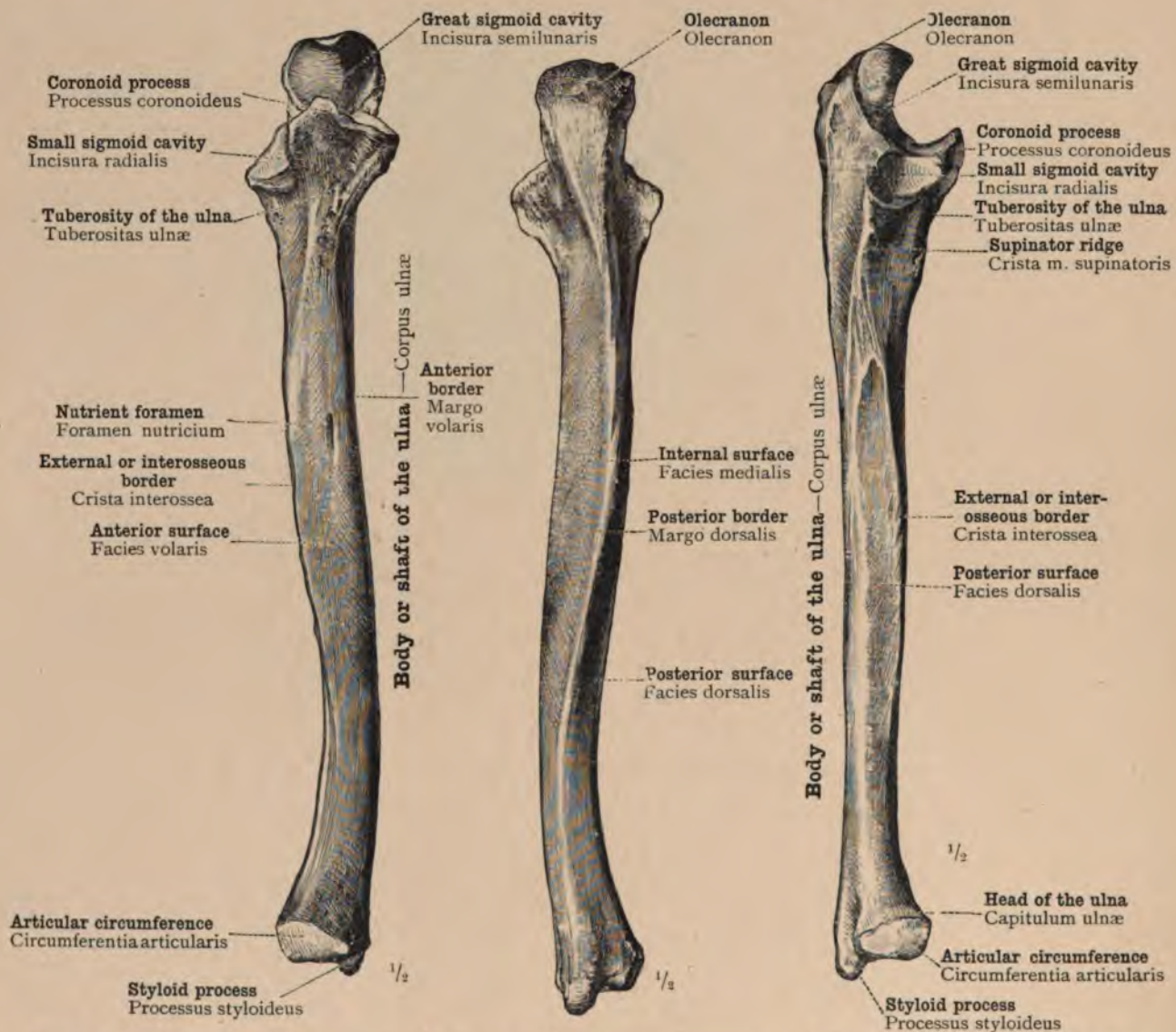


FIG. 258.—ANTERIOR ASPECT.

FIG. 259.—POSTERIOR ASPECT.
THE ULNA OF THE RIGHT SIDE.

FIG. 260.—EXTERNAL ASPECT.

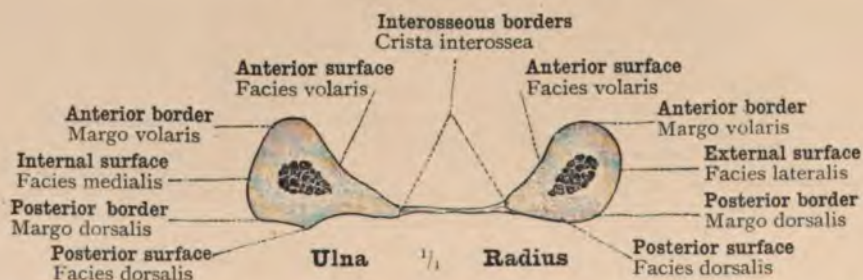


FIG. 261.—TRANSVERSE (HORIZONTAL) SECTION THROUGH THE MIDDLE OF THE ULNA AND THE RADIUS, WITH THE INTEROSSEOUS MEMBRANE, IN SUPINATION.

Ossa antibrachii—The bones of the forearm.

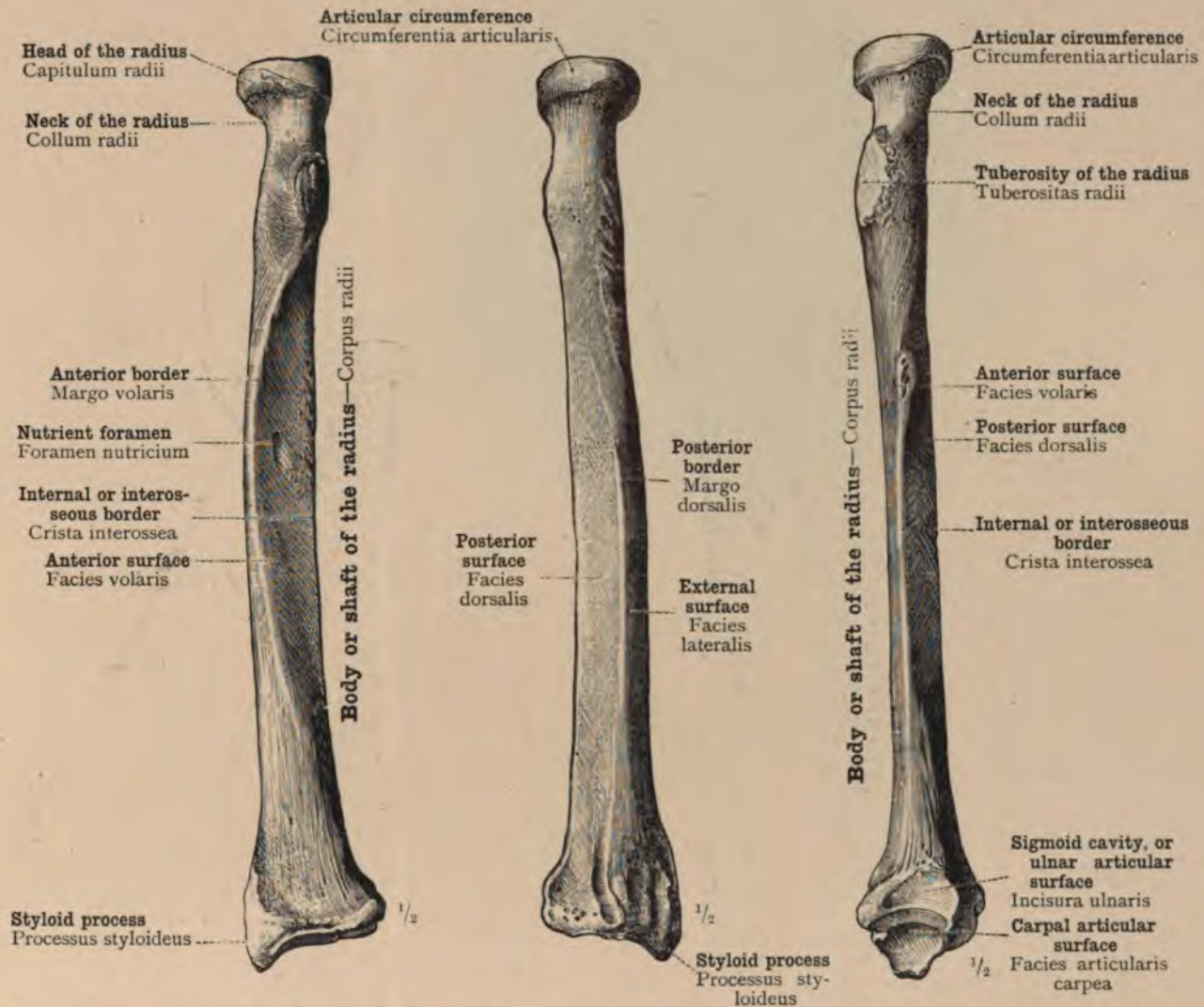


FIG. 262.—ANTERIOR ASPECT. FIG. 263.—POSTERIOR ASPECT. FIG. 264.—INTERNAL ASPECT.
THE RADIUS OF THE RIGHT SIDE.

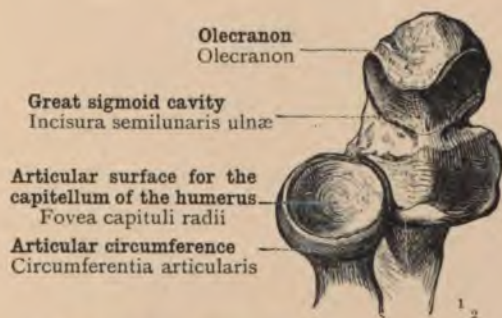


FIG. 265.—THE PROXIMAL EXTREMITIES OF THE BONES OF THE RIGHT FOREARM SEEN FROM ABOVE.



FIG. 266.—THE DISTAL EXTREMITIES OF THE BONES OF THE RIGHT FOREARM SEEN FROM BELOW.

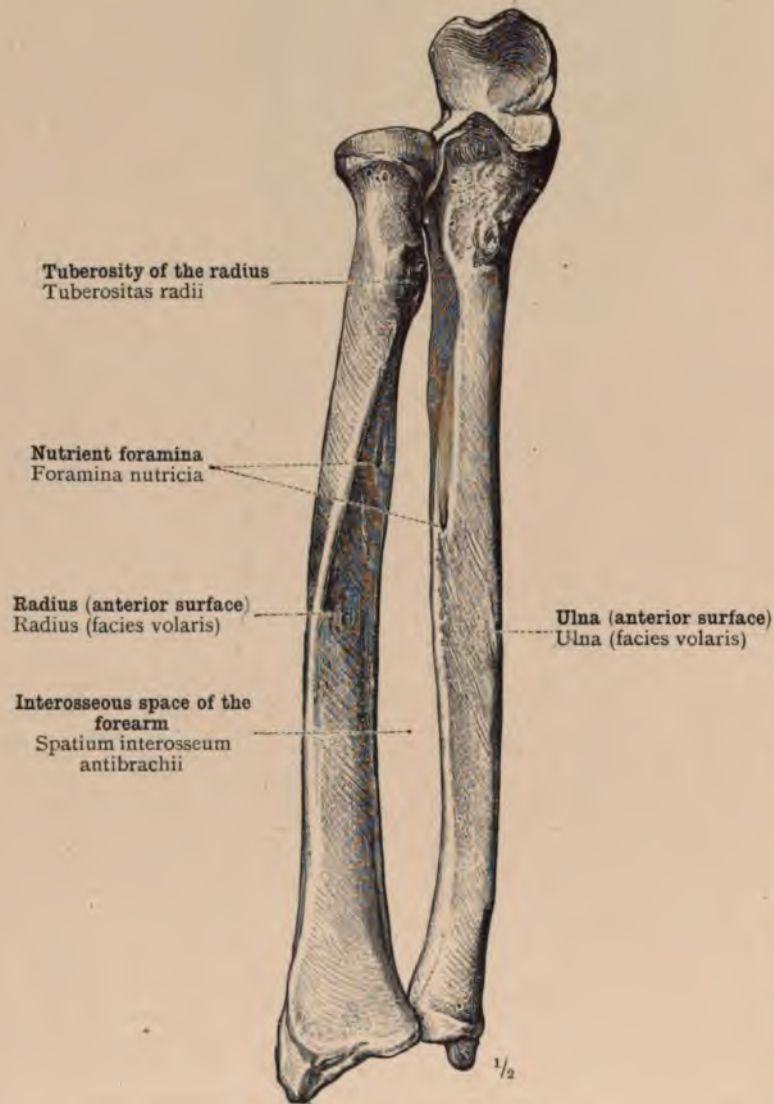


FIG. 267.—THE BONES OF THE RIGHT FOREARM, IN SUPINATION.

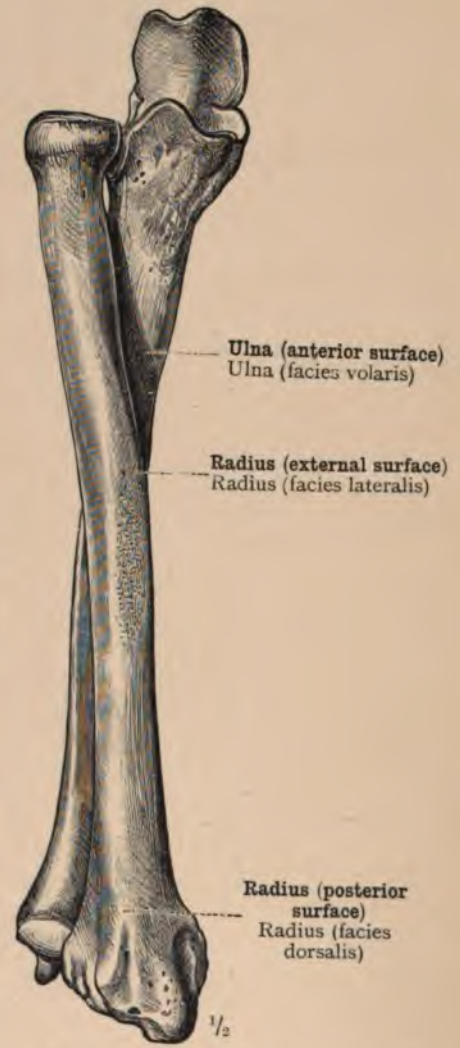


FIG. 268.—THE BONES OF THE LEFT FOREARM, IN PRONATION.

The Bones of the Forearm in Supination and Pronation.



FIG. 269.—FROM A BOY AGED THIRTEEN YEARS.



FIG. 270.—FROM A BOY AGED SEVENTEEN YEARS.

THE DEVELOPMENT OF THE EPIPHYSIS OF THE PROXIMAL EXTREMITY OF THE ULNA.

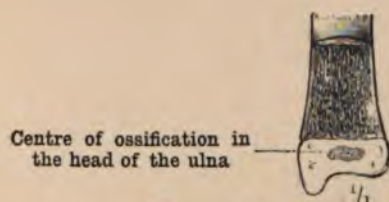


FIG. 271.—FROM A GIRL AGED SIX YEARS.

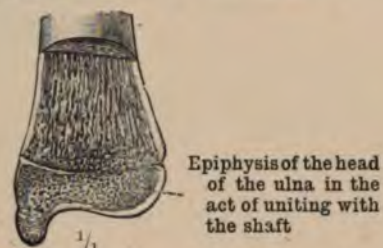


FIG. 272.—FROM A YOUNG MAN AGED NINETEEN YEARS.

THE DEVELOPMENT OF THE EPIPHYSIS OF THE DISTAL EXTREMITY OF THE ULNA.

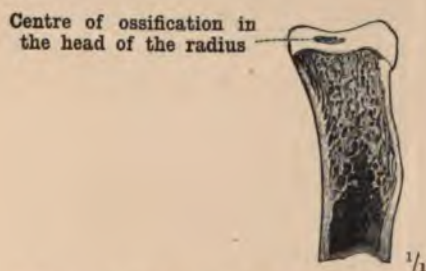


FIG. 273.—FROM A BOY AGED FIVE YEARS.

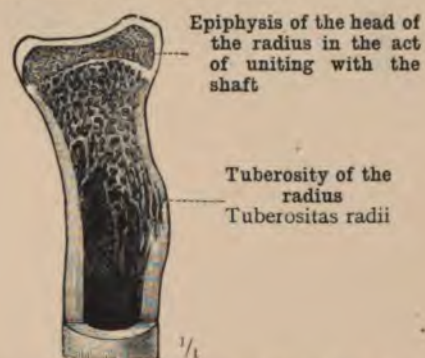


FIG. 274.—FROM A BOY AGED SEVENTEEN YEARS.

THE DEVELOPMENT OF THE EPIPHYSIS OF THE PROXIMAL EXTREMITY OF THE RADIUS.

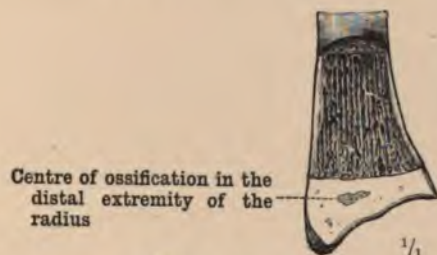


FIG. 275.—FROM A GIRL AGED TWO YEARS.



FIG. 276.—FROM A YOUNG MAN AGED NINETEEN YEARS.

THE DEVELOPMENT OF THE EPIPHYSIS OF THE DISTAL EXTREMITY OF THE RADIUS.

Development of the Bones of the Forearm.

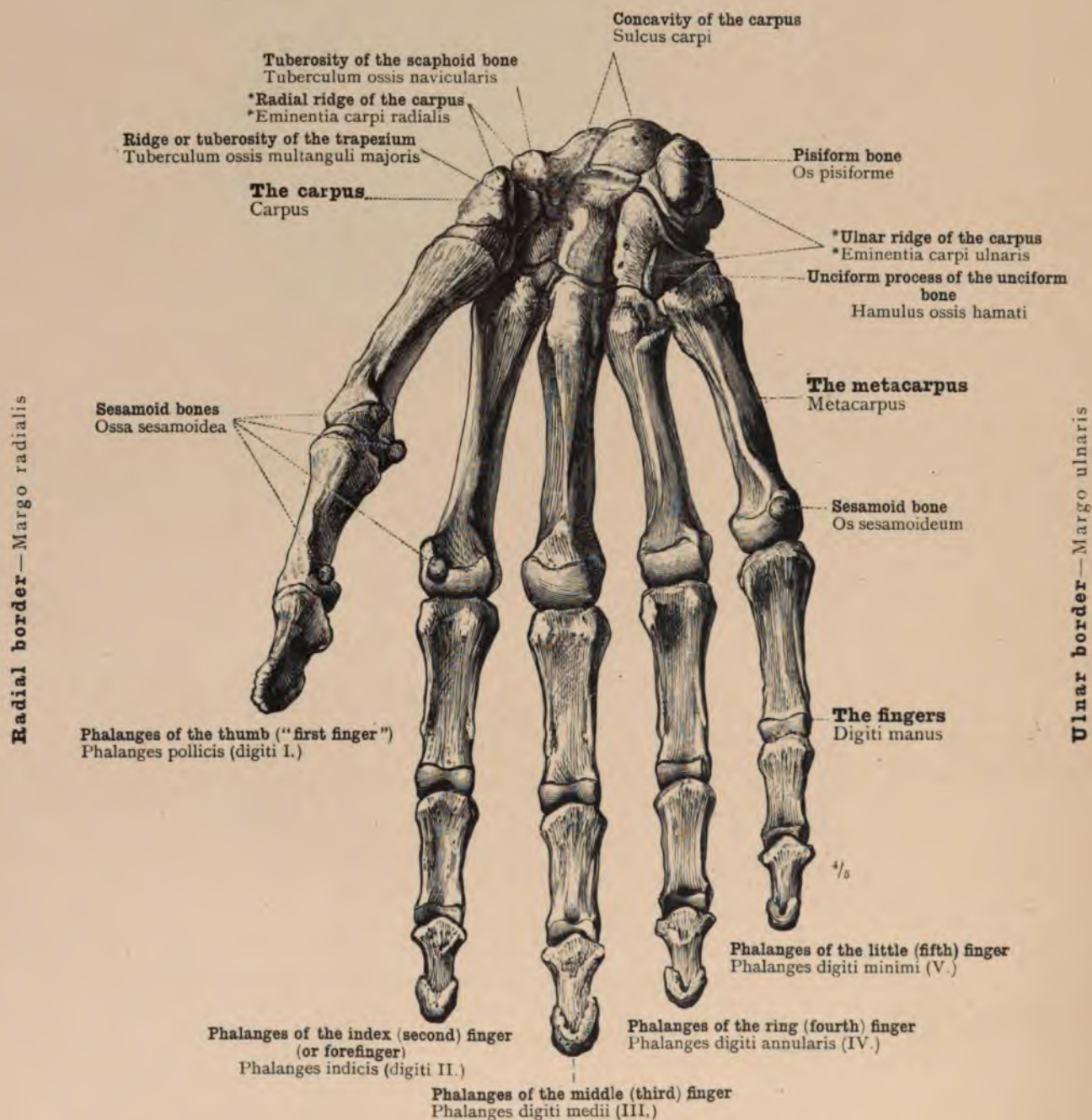


FIG. 277.—PALMAR ASPECT OF THE SKELETON OF THE RIGHT HAND (FACIES VOLARIS).

Skeleton manus—The skeleton of the hand.

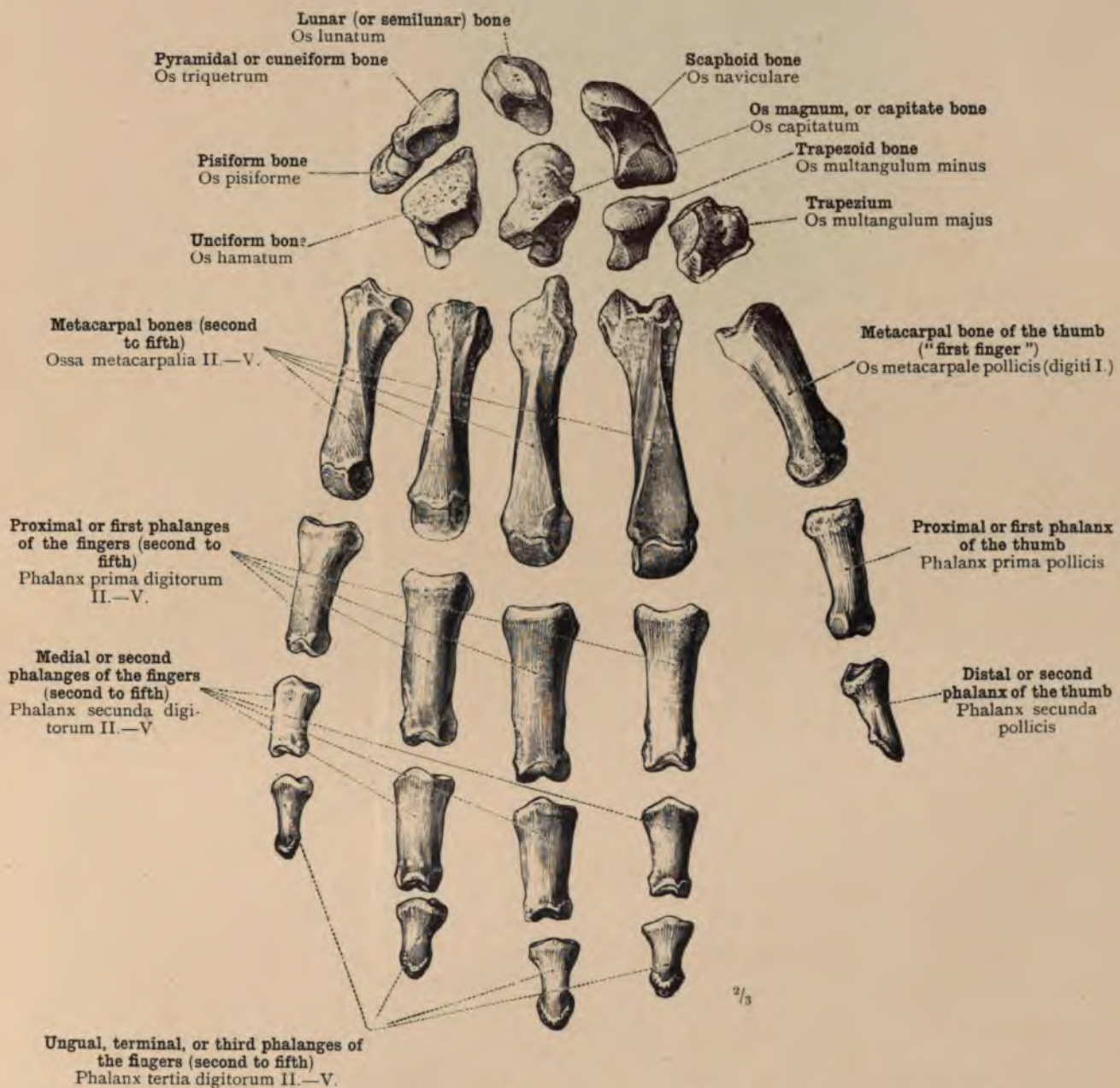


FIG. 278.—DORSAL ASPECT OF THE BONES OF THE RIGHT HAND SEEN FROM THE DORSAL SIDE (FACIES DORSALIS).

Skeleton manus—The skeleton of the hand.



FIG. 279.—DISTAL ASPECT.

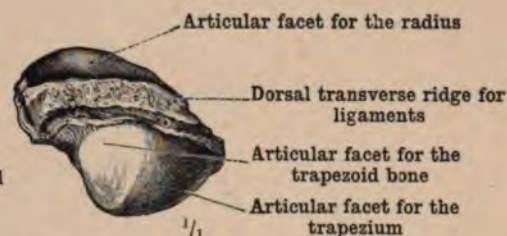


FIG. 280.—POSTERIOR ASPECT.

OS NAVICULARE MANUS—THE RIGHT SCAPHOID BONE.

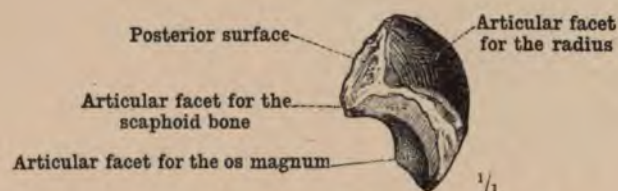


FIG. 281.—RADIAL ASPECT.



FIG. 282.—ULNAR ASPECT.

OS LUNATUM—THE RIGHT LUNAR (OR SEMILUNAR) BONE.

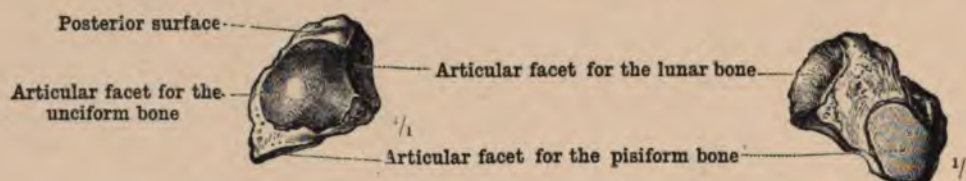


FIG. 283.—RADIAL ASPECT.

FIG. 284.—PALMAR ASPECT.

OS TRIQUETRUM—THE RIGHT PYRAMIDAL OR CUNEIFORM BONE.



FIG. 285.—PALMAR ASPECT.

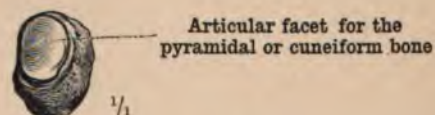


FIG. 286.—POSTERIOR ASPECT.

OS PISIFORME—THE RIGHT PISIFORM BONE.



FIG. 287. THE POSTERIOR ASPECT OF THE RIGHT CARPUS, CONTAINING AN OS CENTRALE

Ossa carpi—The bones of the carpus: first, superior, or proximal row.

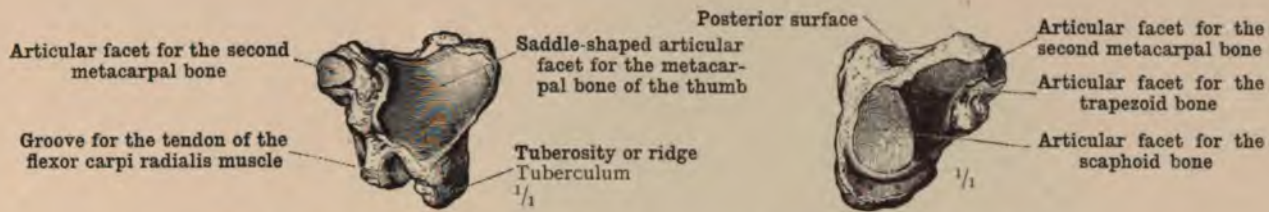


FIG. 288.—DISTAL ASPECT.

FIG. 289.—ULNAR ASPECT.

OS MULTANGULUM MAJUS—THE RIGHT TRAPEZIUM.

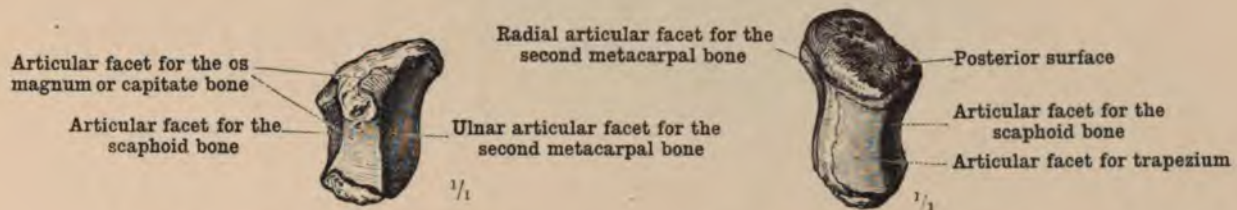


FIG. 290.—ULNAR ASPECT.

FIG. 291.—RADIAL ASPECT.

OS MULTANGULUM MINUS—THE RIGHT TRAPEZOID BONE.

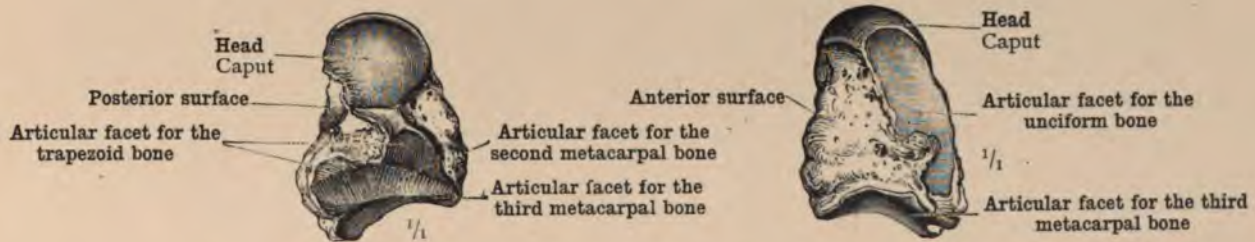


FIG. 292.—RADIAL ASPECT.

FIG. 293.—ULNAR ASPECT.

OS CAPITATUM—THE RIGHT OS MAGNUM OR CAPITATE BONE.

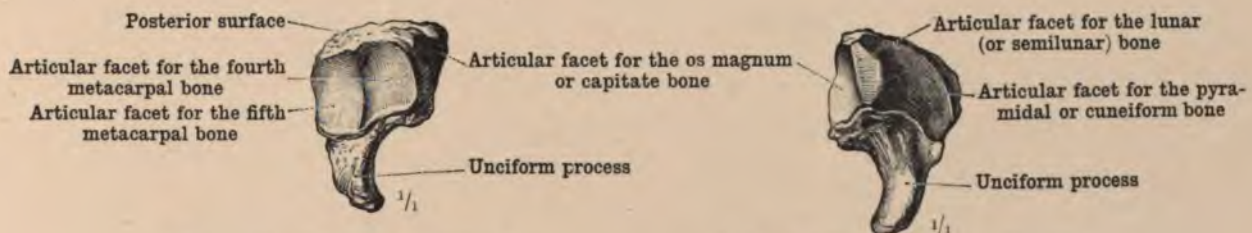


FIG. 294.—DISTAL ASPECT.

FIG. 295.—PROXIMAL ASPECT.

OS HAMATUM—THE RIGHT UNCIFORM BONE.

Ossa carpi—The bones of the carpus: second, inferior, or distal row.

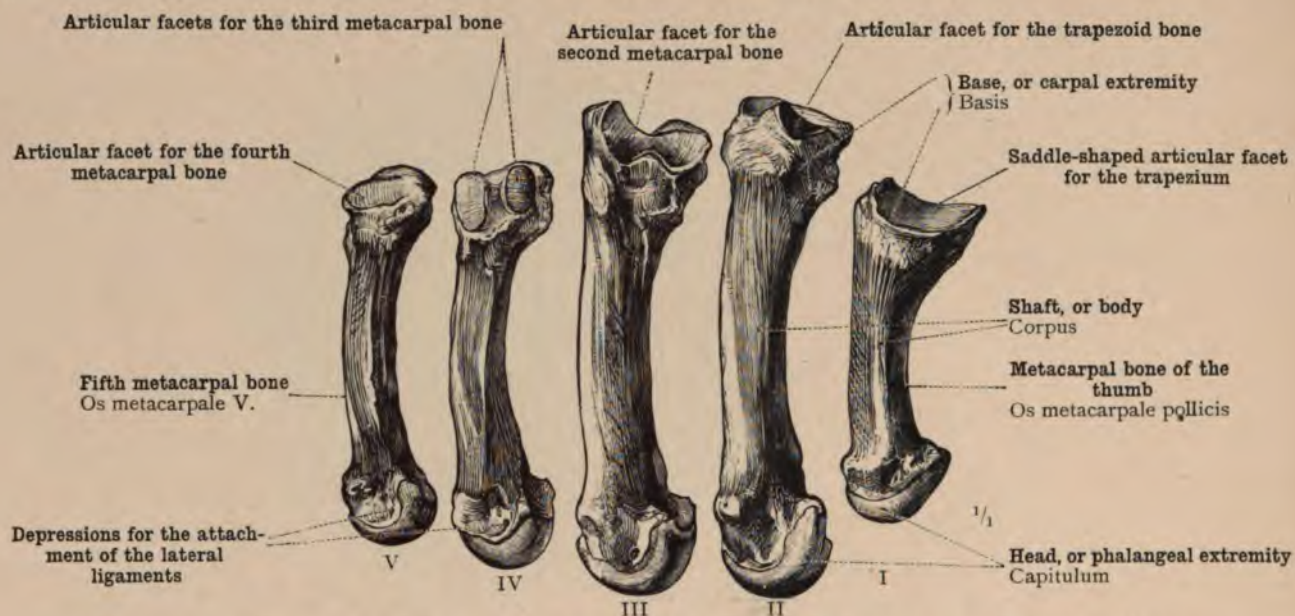


FIG. 296.—RADIAL ASPECT OF THE FIVE METACARPAL BONES OF THE RIGHT HAND.

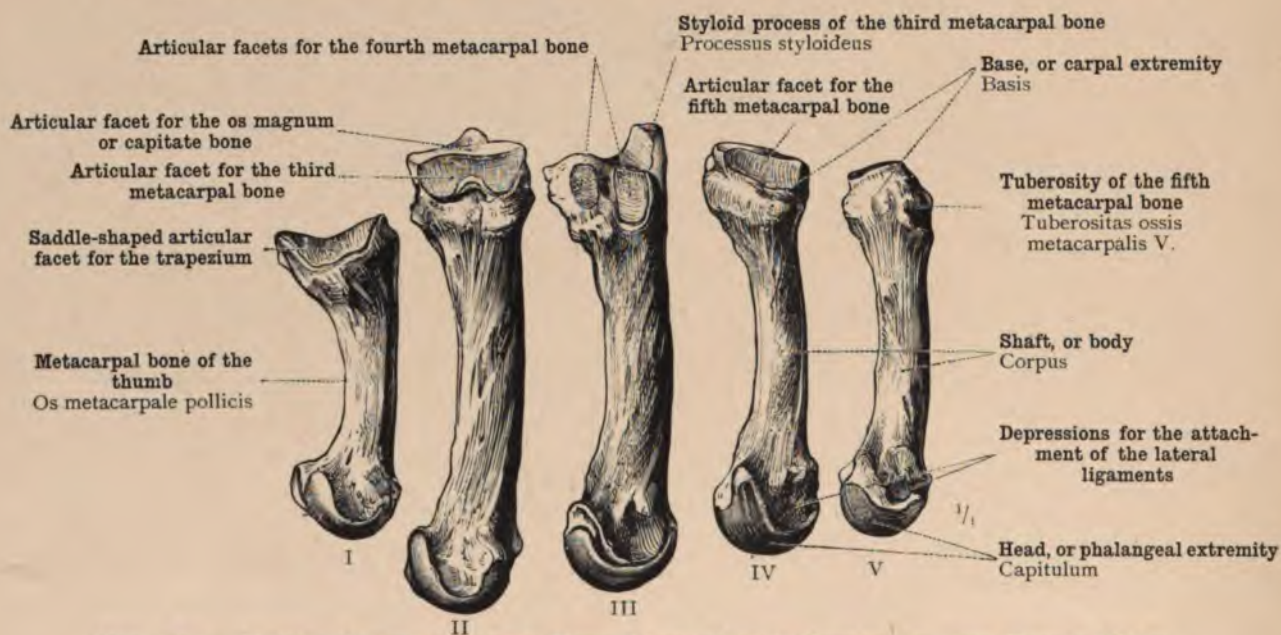


FIG. 297.—ULNAR ASPECT OF THE FIVE METACARPAL BONES OF THE RIGHT HAND.

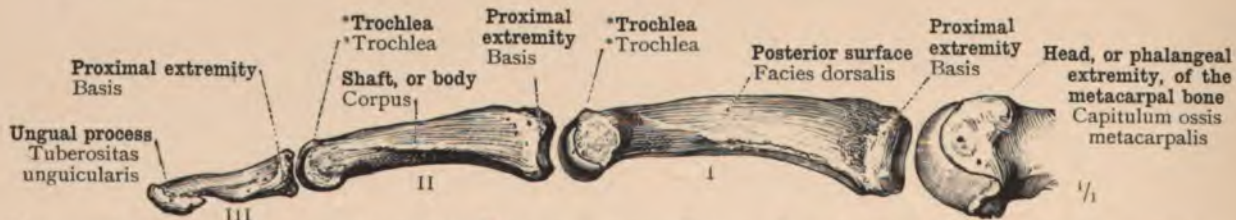


FIG. 298.—RADIAL ASPECT OF THE BONES OF THE RIGHT INDEX FINGER (MARGO RADIALIS DIGITI SECUNDI).

The Metacarpal Bones of the Hand and the Phalanges of the Fingers.



FIG. 299.—IN THE SECOND YEAR OF LIFE.

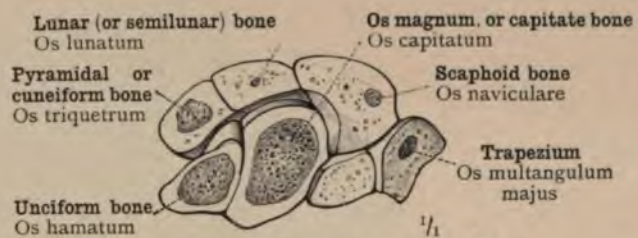


FIG. 300.—IN THE SEVENTH YEAR OF LIFE.

CENTRES OF OSSIFICATION OF THE CARPUS (SECTIONS PARALLEL TO THE POSTERIOR SURFACE).

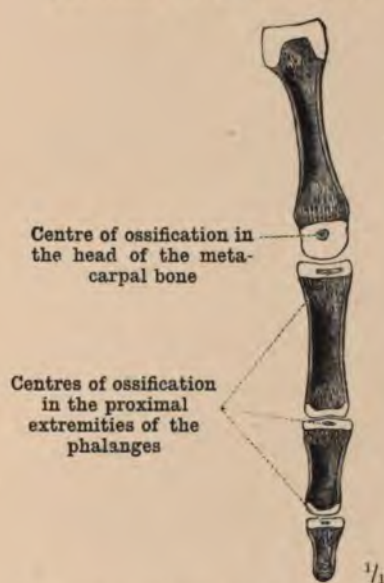


FIG. 301.—MIDDLE FINGER IN THE SECOND YEAR OF LIFE.



FIG. 302.—MIDDLE FINGER IN THE SEVENTH YEAR OF LIFE.

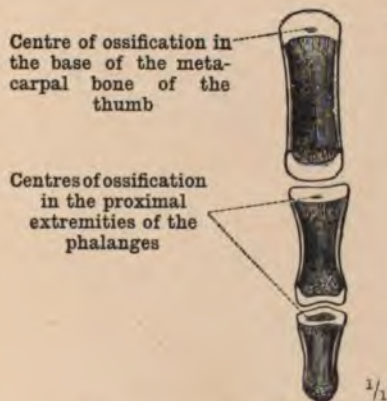


FIG. 304.—BONES OF THE THUMB IN THE FOURTH YEAR OF LIFE.

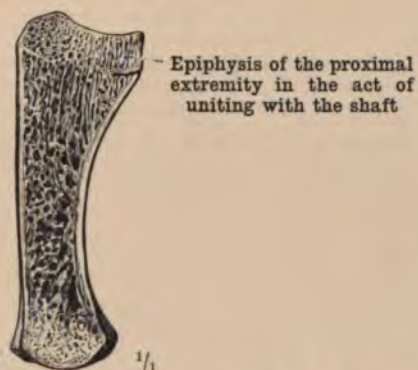


FIG. 305.—METACARPAL BONE OF THE THUMB IN THE EIGHTEENTH YEAR OF LIFE.

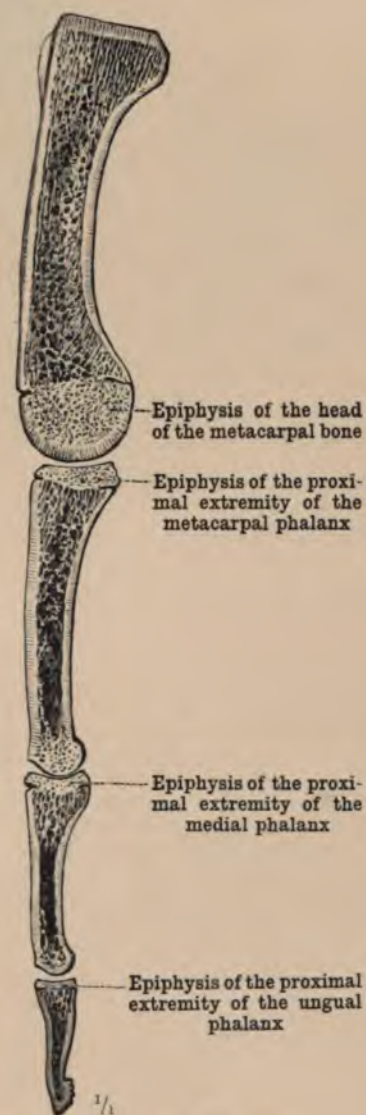


FIG. 303.—EPIPHYSES OF THE BONES OF THE MIDDLE FINGER IN THE ACT OF UNITING WITH THE SHAFTS: SEVENTEENTH YEAR OF LIFE.

Development of the Bones of the Hand.

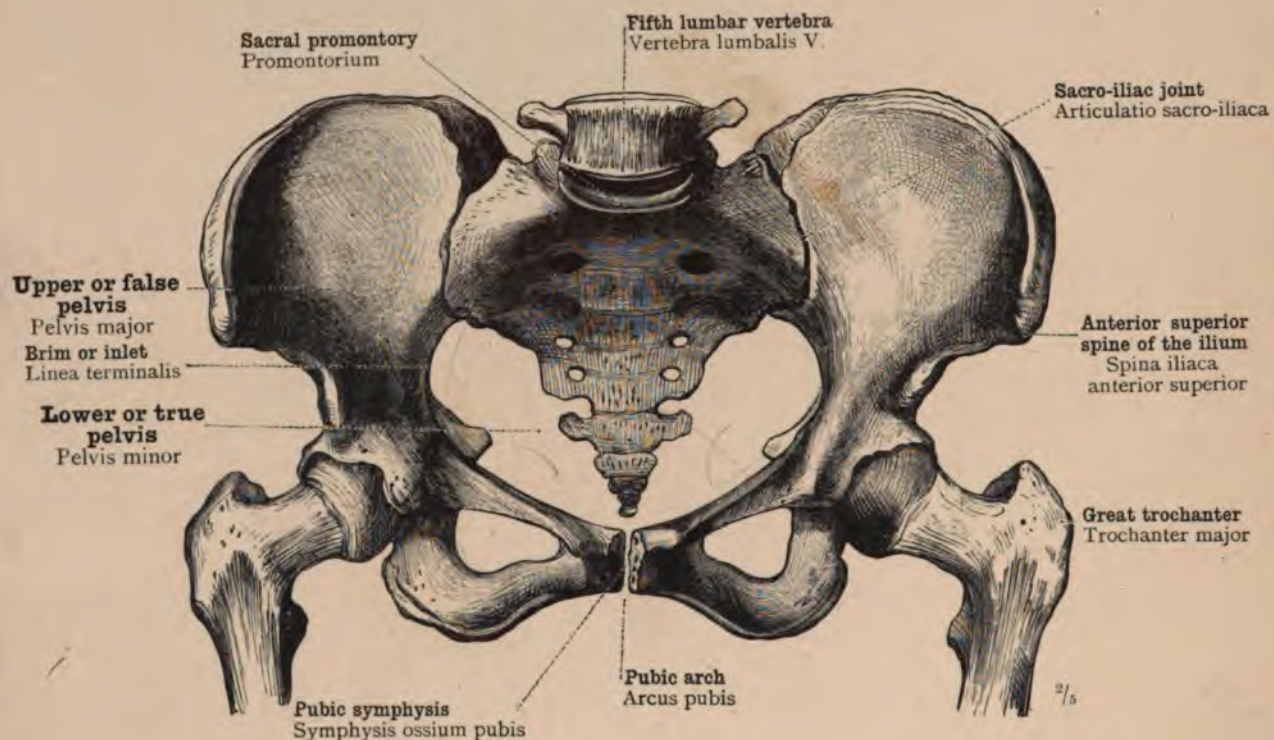


FIG. 306.—PELVIS MULIEBRIS—THE FEMALE PELVIS. ANTERIOR ASPECT.

The formation of the pelvis out of the sacrum and coccyx and the two innominate bones. The iliac portions of the innominate bones with the base of the sacrum constitute the upper or false pelvis; the pubic and ischiatic portions of the innominate bones with the sacrum and the coccyx constitute the lower or true pelvis; the boundary between the false and the true pelvis corresponds with the upper aperture or entrance of the true pelvis, the line separating the two being known as the brim or inlet of the true pelvis. Regarded as the means of attachment of the lower limb to the trunk, the pelvis is the cingulum extremitatis inferioris, or pelvic girdle.

Cingulum extremitatis inferioris—Pelvic girdle.

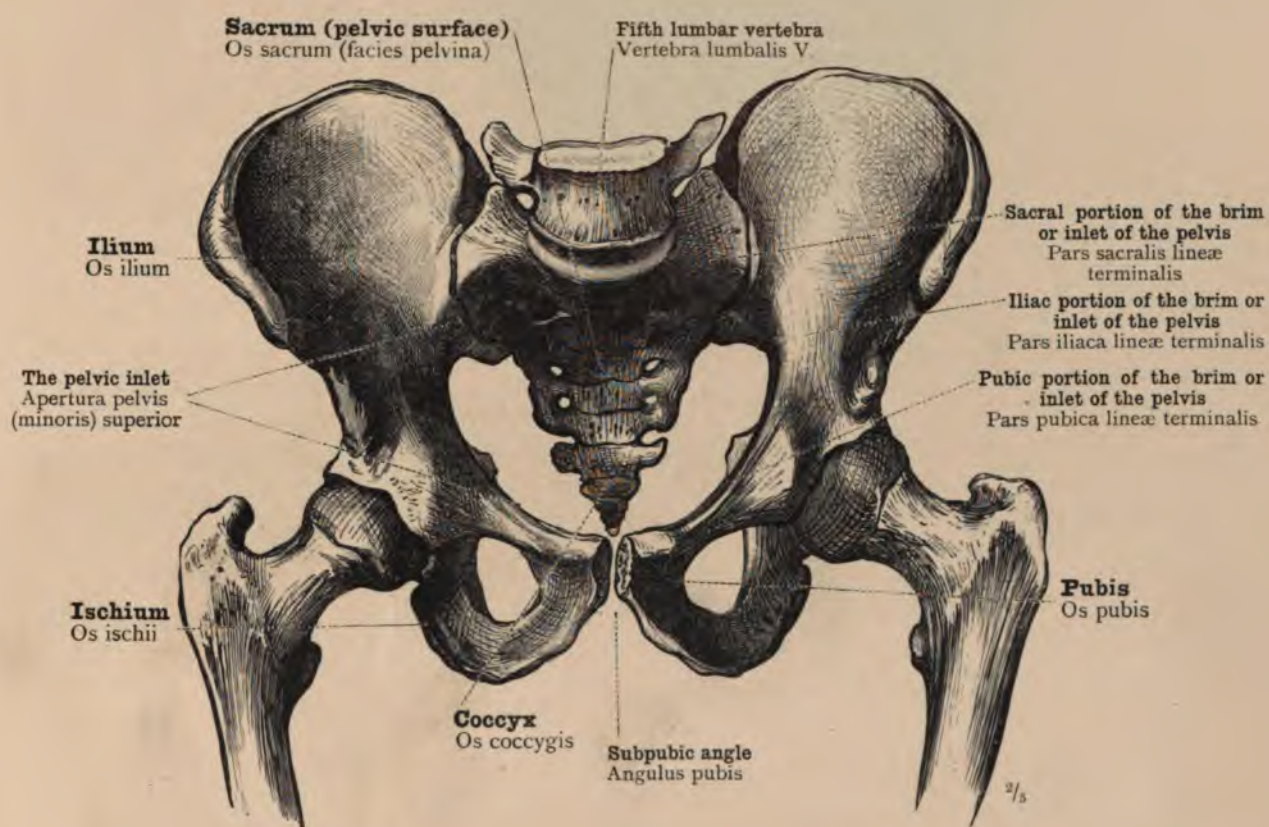


FIG. 307.—PELVIS VIRILIS—THE MALE PELVIS. ANTERIOR ASPECT.

The upper or false and the lower or true pelvis, pelvis major and pelvis minor. The brim of the true pelvis is divided into a sacral, an iliac, and a pubic portion.

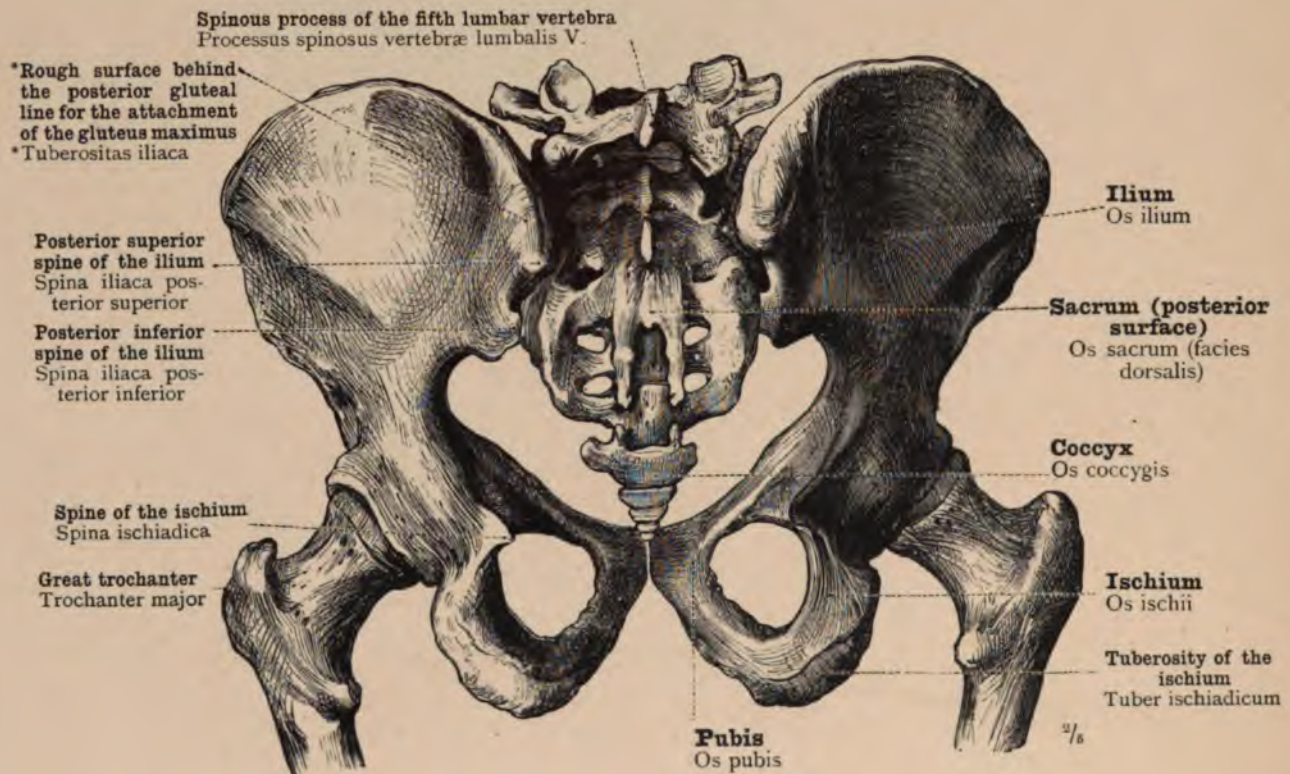


FIG. 308.—PELVIS VIRILIS—THE MALE PELVIS. POSTERIOR ASPECT.

The pelvic outlet, apertura pelvis (minoris) inferior, in the bony pelvis appears to be bounded on either side by the lower borders of the pubis and the ischium and the greater and lesser sciatic notches, incisuræ ischiadicæ major et minor, and behind by the projecting part of the sacrum and by the coccyx. But inasmuch as on either side there are two strong ligaments arising from the sacrum and coccyx, the great and the small sacrosciatic ligaments, ligamenta sacrotuberosum et sacrospinosum, which stretch across the two sciatic notches, and thus enlarge the posterior and lateral walls of the true pelvis, by this means the sciatic notches are filled in, and the outlet of the pelvis is notably diminished in size.

Cingulum extremitatis inferioris—Pelvic girdle.

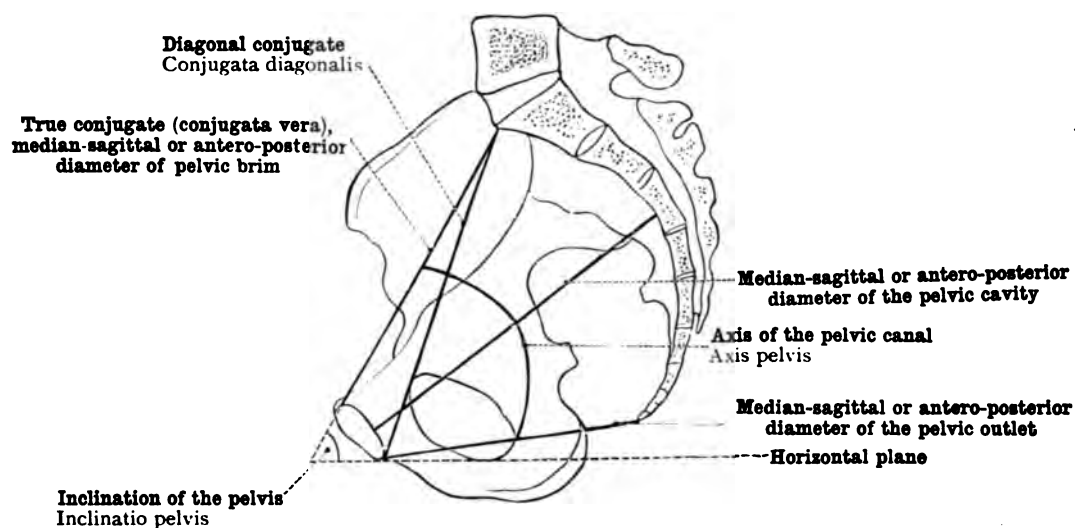


FIG. 309.—THE MEDIAN-SAGITTAL OR ANTERO-POSTERIOR DIAMETERS OF THE TRUE PELVIS.

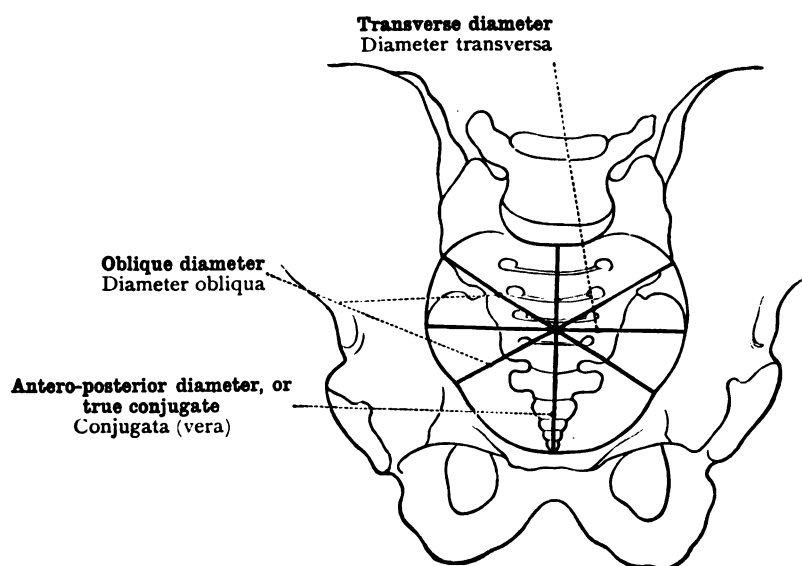
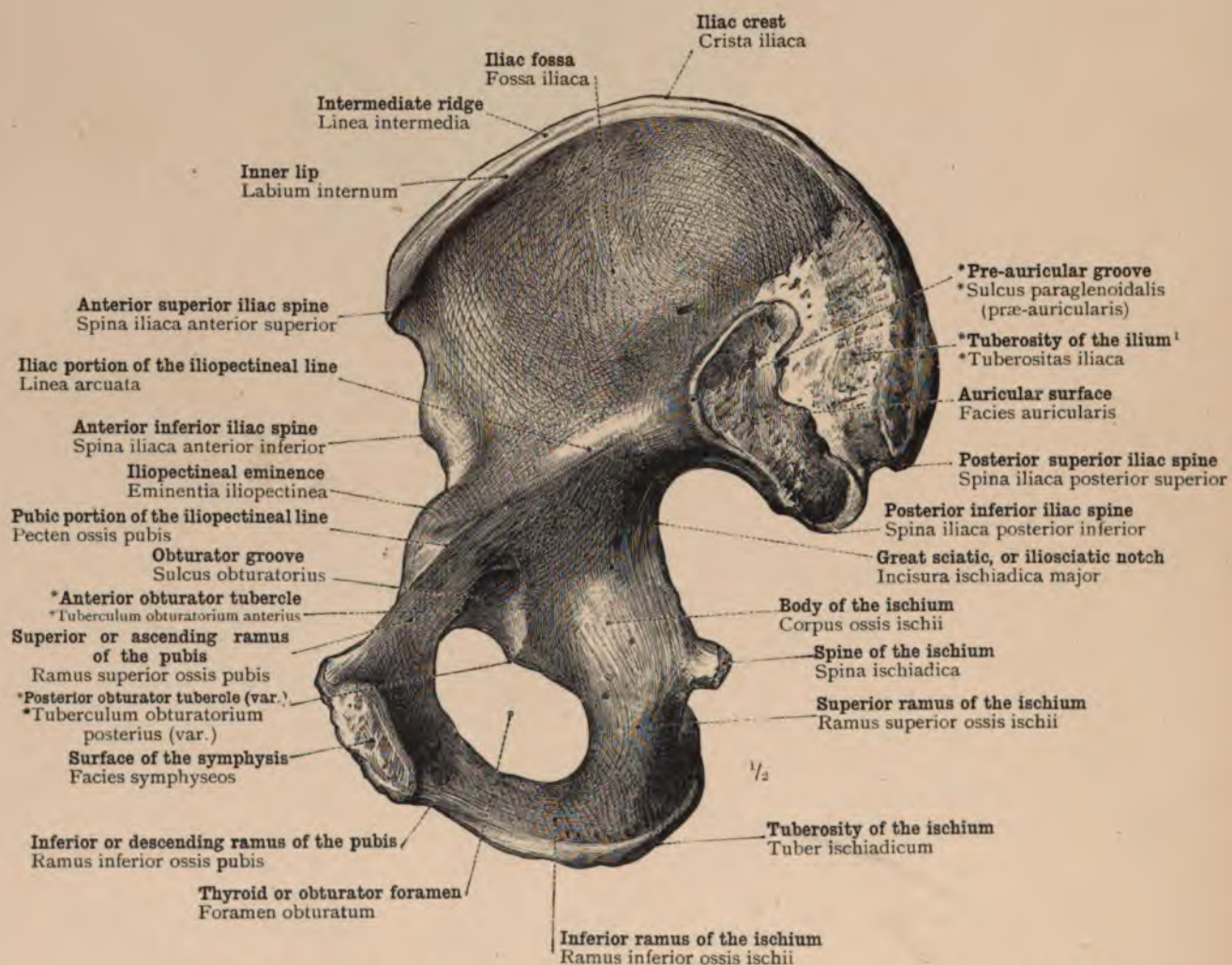


FIG. 310.—THE DIAMETERS OF THE PELVIC INLET (APERTURA PELVIS SUPERIOR).

The Principal Diameters of the True Pelvis.



¹ This term, which is seldom used by English anatomists, denotes the posterior fifth of the crest of the ilium and the rough surface of bone immediately below the crest on either side.—Tr.

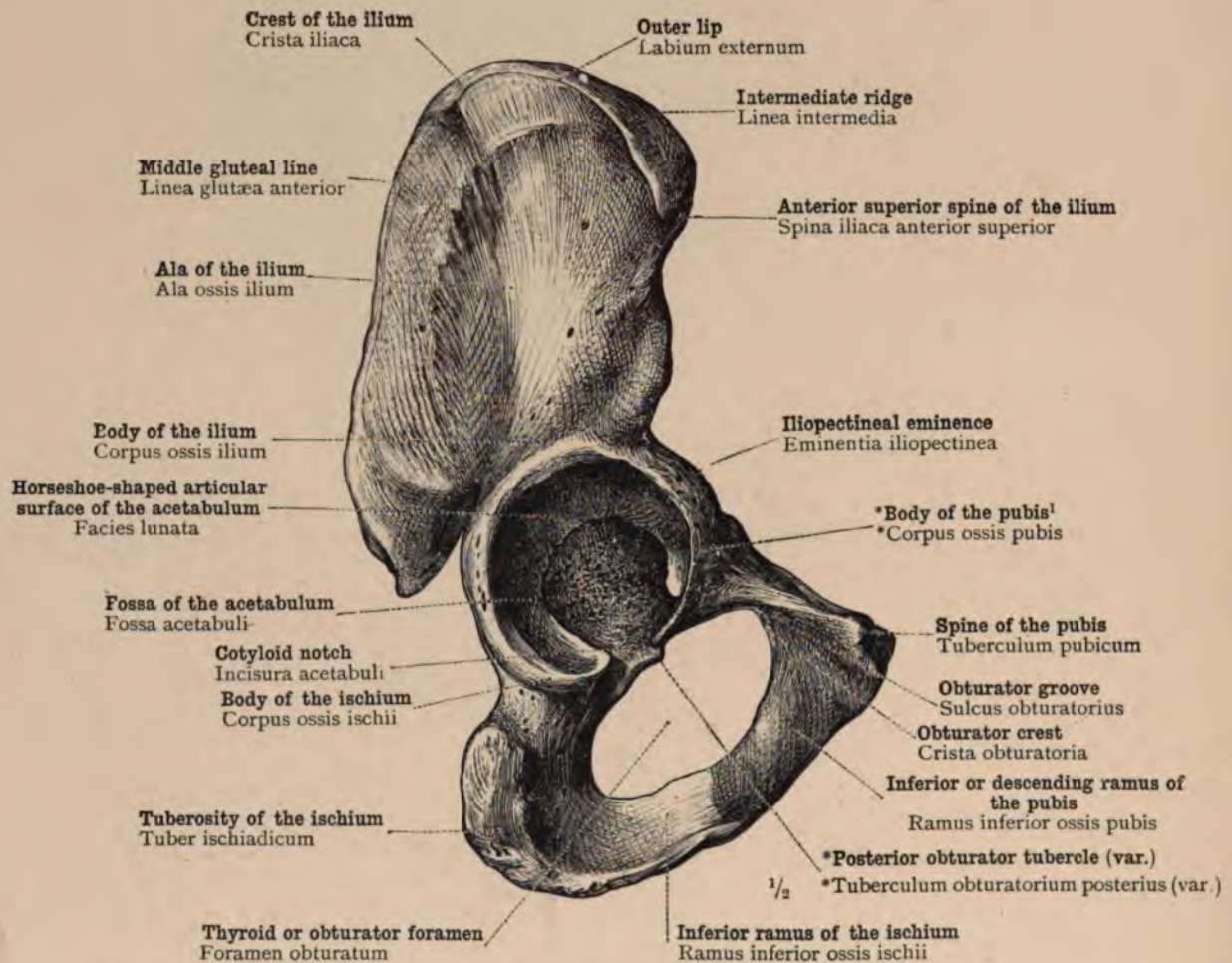
FIG. 311.—THE RIGHT HIP-BONE. INNER ASPECT.

Os coxæ—Hip-bone or innominate bone.



FIG. 312.—THE RIGHT HIP-BONE, OUTER SIDE. POSTERIOR ASPECT.

Os coxæ—Hip-bone.



¹ *Body of the pubis*: The use of this term by English anatomists is a variable one. Macalister, whose terminology here, as usual, is in conformity with that of Continental anatomists, writes: "The pubis consists of a body which forms a little less than one-fifth of the acetabulum . . ."; Quain, on the other hand, writes: "The flat portion between the rami [of the pubis] is the body"; and Young, in his "Synopsis of Human Anatomy" (U.S.), follows Quain's usage. The Continental application of the term has, however, the advantage in the point of consistency, the *body* being then, in the case of each of the three elements of the hip-bone, the thickened portion taking part in the formation of the acetabulum, of which the *body of the pubis* constitutes about one-fifth, the *body of the ilium* nearly two-fifths, and the *body of the ischium* the remainder.—TR.

FIG. 313.—THE RIGHT HIP-BONE, OUTER SIDE. SEEN FROM THE RIGHT.

Os coxæ—Hip-bone.

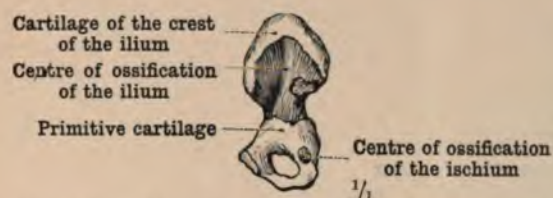


FIG. 314.—IN THE FIFTH MONTH OF FÆTAL LIFE (MONTHS OF FOUR WEEKS EACH).



FIG. 315.—IN THE SIXTH MONTH OF FÆTAL LIFE (MONTHS OF FOUR WEEKS EACH).

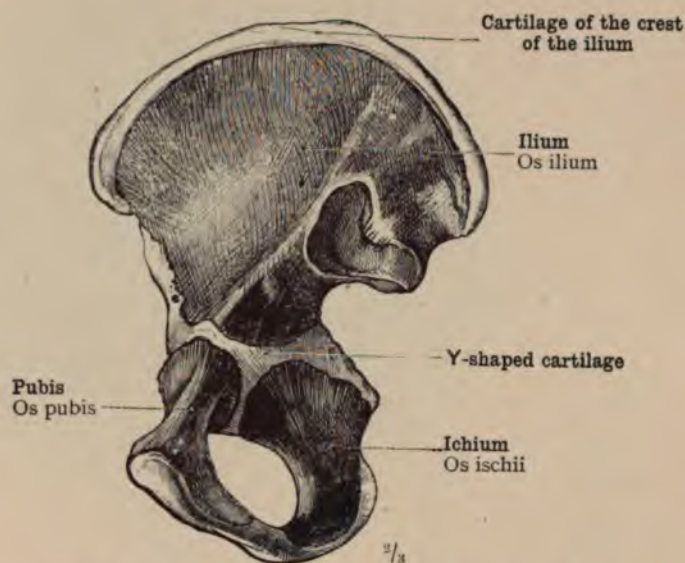


FIG. 316.—IN THE FOURTH YEAR OF LIFE.

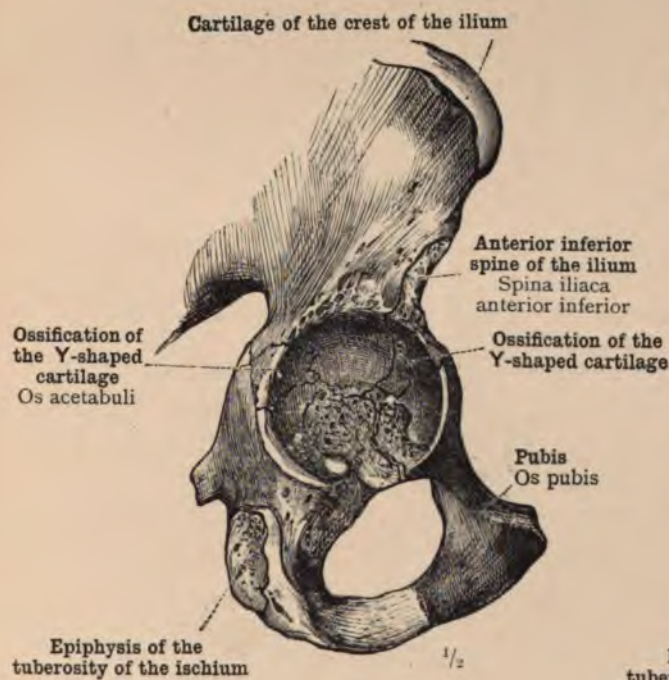


FIG. 317.—IN THE FOURTEENTH YEAR OF LIFE.

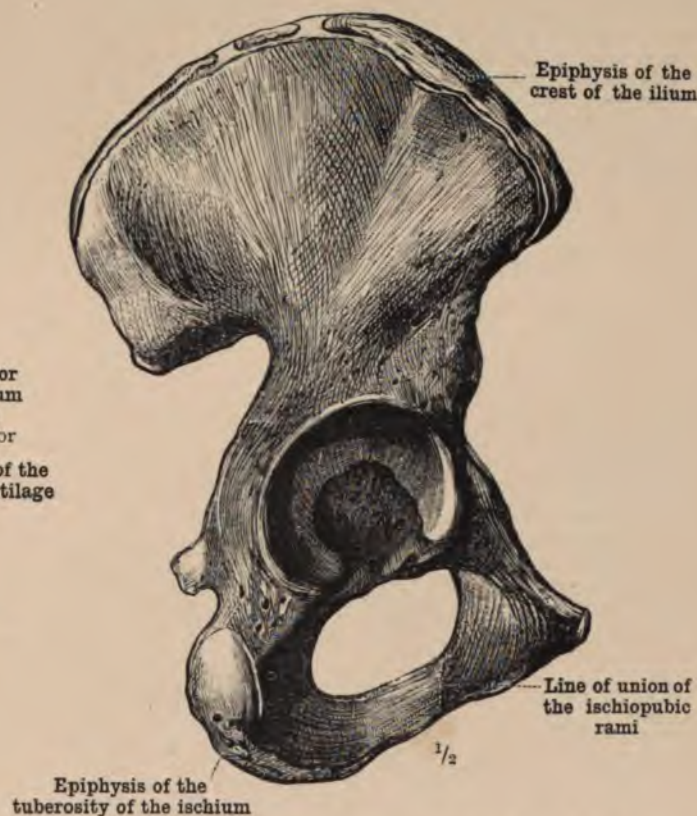


FIG. 318.—IN THE SEVENTEENTH YEAR OF LIFE.

Development of the Hip-Bone.

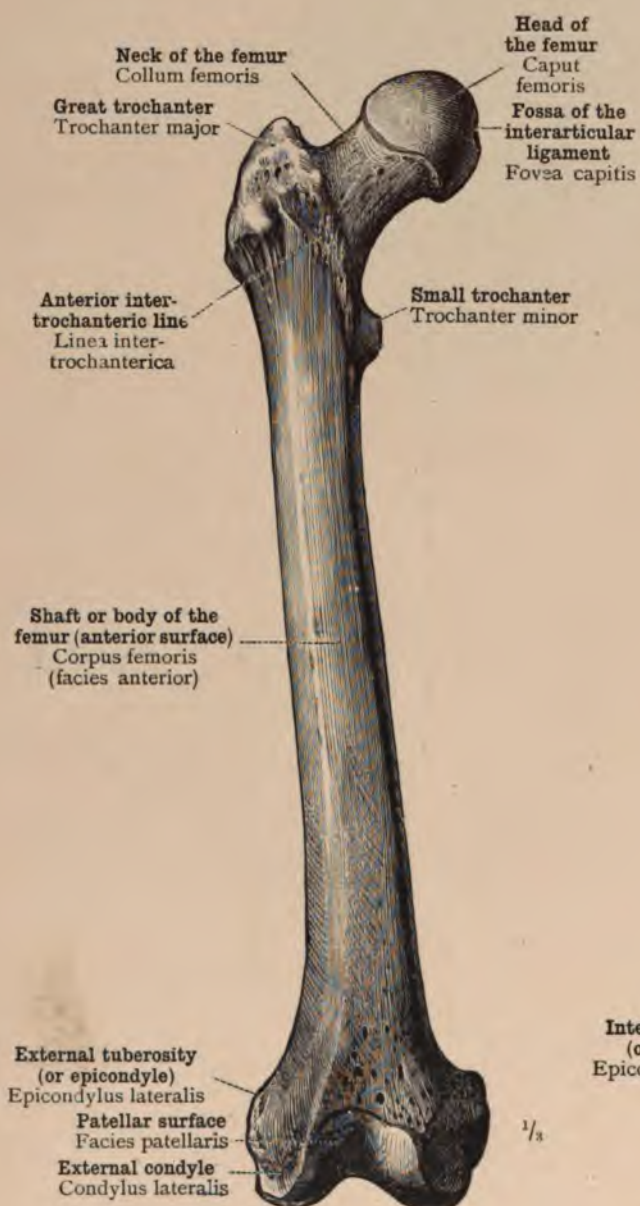


FIG. 319.—THE RIGHT FEMUR,
ANTERIOR ASPECT.

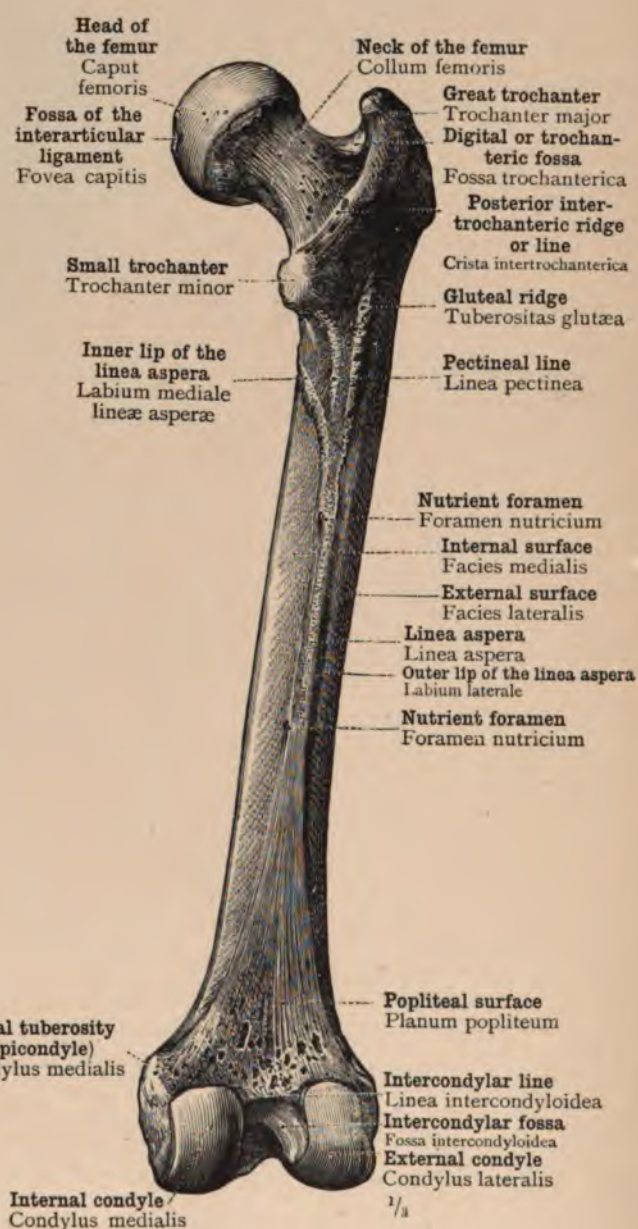
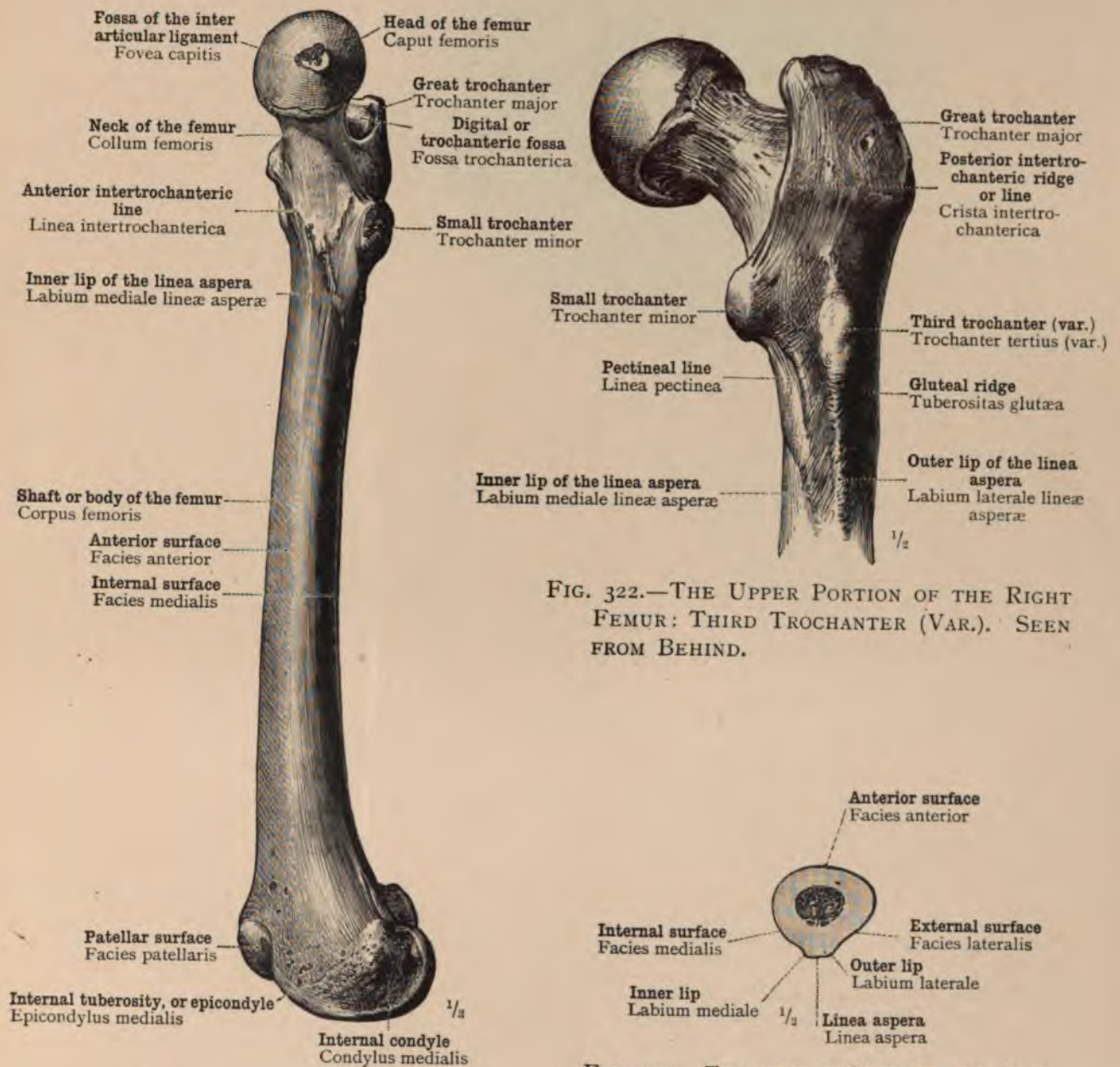


FIG. 320.—THE RIGHT FEMUR,
POSTERIOR ASPECT.

Femur—The femur, or thigh-bone.



Femur—The femur.

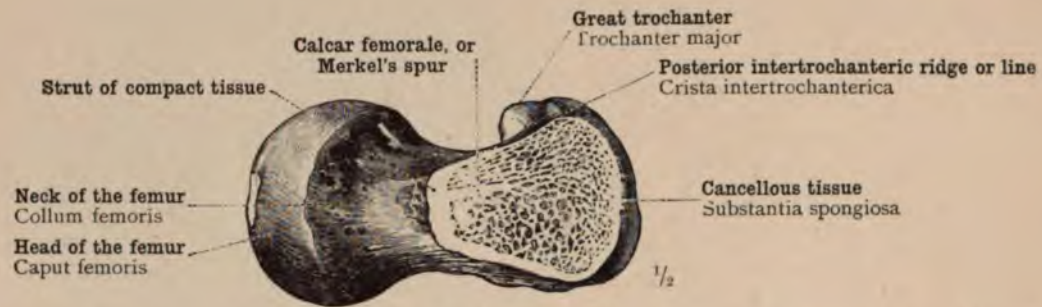


FIG. 324.—HORIZONTAL SECTION THROUGH THE PROXIMAL EXTREMITY OF THE RIGHT FEMUR, ABOVE THE SMALL TROCHANTER, TO SHOW THE CALCAR FEMORALE.

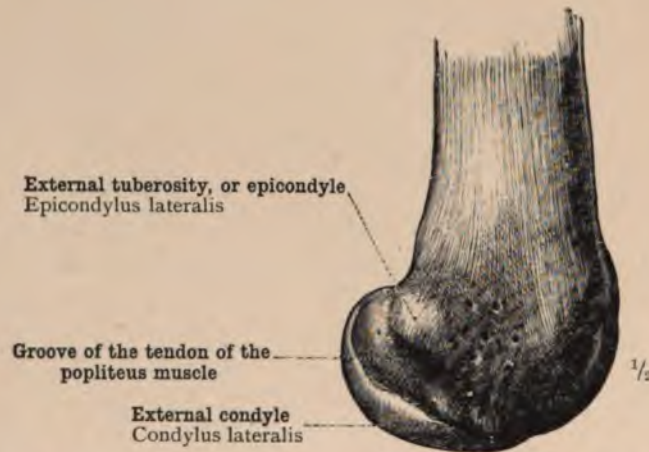


FIG. 325.—DISTAL EXTREMITY OF THE RIGHT FEMUR. SEEN FROM THE OUTER SIDE.



FIG. 326.—DISTAL ARTICULAR EXTREMITY OF THE RIGHT FEMUR. SEEN FROM BELOW.

Femur—The femur.

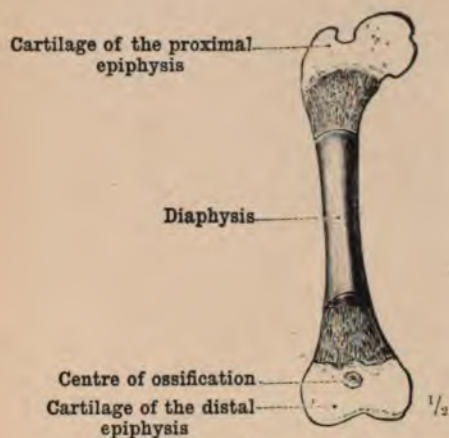


FIG. 327.—FROM A BOY STILL-BORN AT FULL TERM.
Body-length, 21 inches.

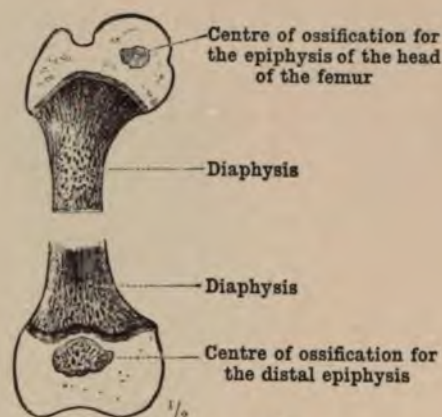


FIG. 328.—FROM A BOY AGED NINE AND A HALF MONTHS.

THE CENTRES OF OSSIFICATION OF THE PROXIMAL AND DISTAL EPIPHYSES.



FIG. 329.—FROM A GIRL AGED SEVEN YEARS.

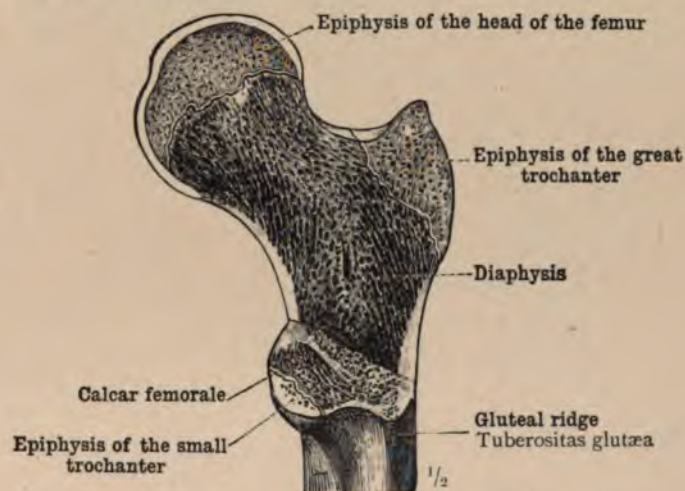


FIG. 330.—FROM A GIRL AGED FIFTEEN YEARS.

THE EPIPHYSES OF THE PROXIMAL EXTREMITY.

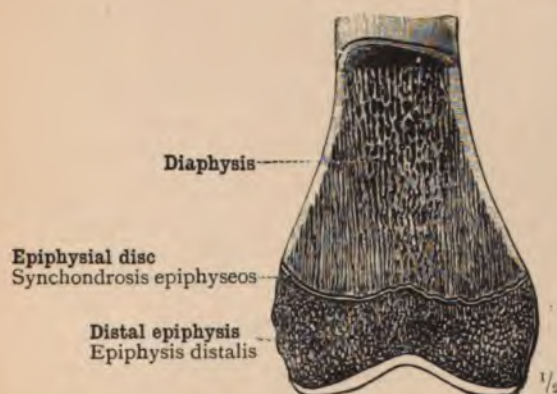


FIG. 331.—IN FRONTAL SECTION.

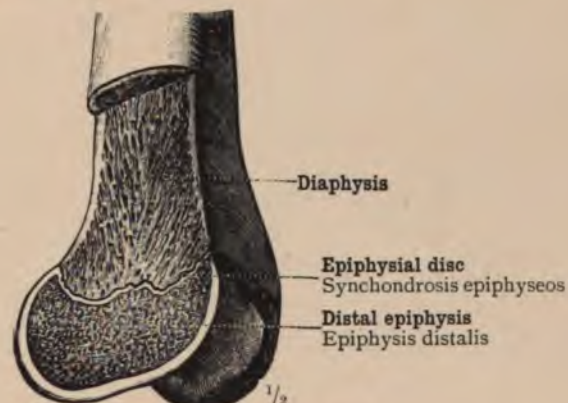


FIG. 332.—IN SAGITTAL SECTION.

THE EPIPHYSIS OF THE DISTAL EXTREMITY FROM A GIRL AGED FIFTEEN YEARS.

Development of the Femur.



FIG. 333.—ANTERIOR ASPECT.



FIG. 334.—POSTERIOR ASPECT.

THE RIGHT TIBIA.

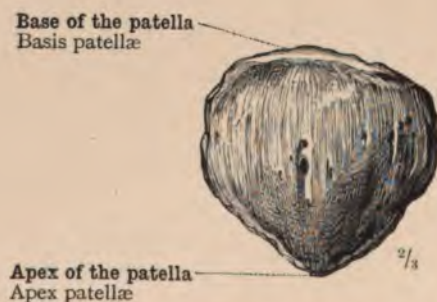


FIG. 335.—ANTERIOR SURFACE.

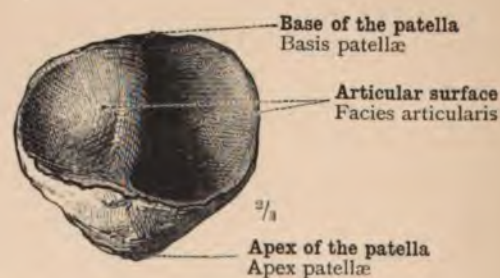


FIG. 336.—POSTERIOR SURFACE.

THE RIGHT PATELLA.

Ossa cruris—The bones of the leg: the patella, rotula, or knee-pan.

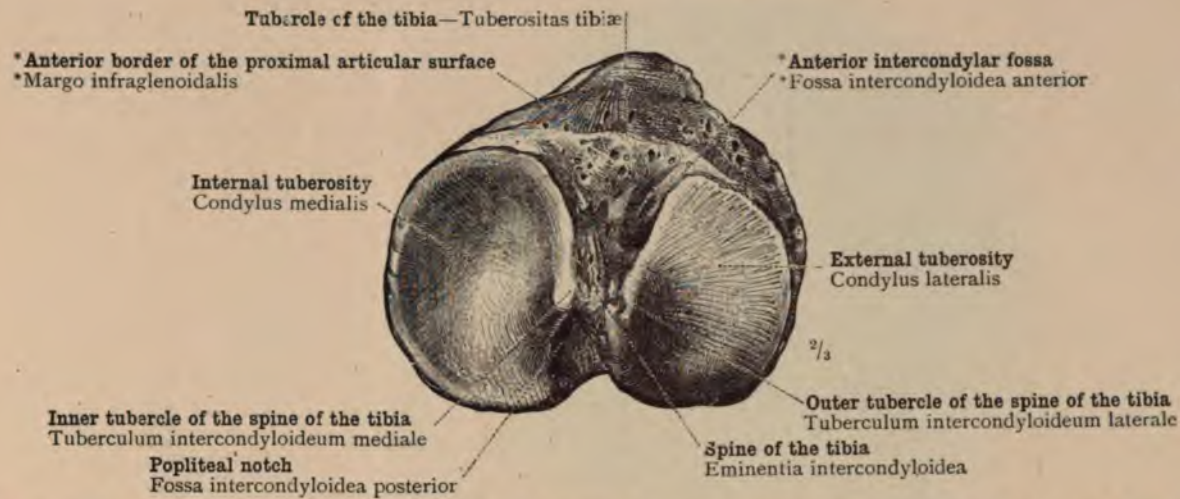


FIG. 338.—FACIES ARTICULARIS SUPERIOR TIBIÆ—THE PROXIMAL ARTICULAR SURFACE OF THE RIGHT TIBIA.

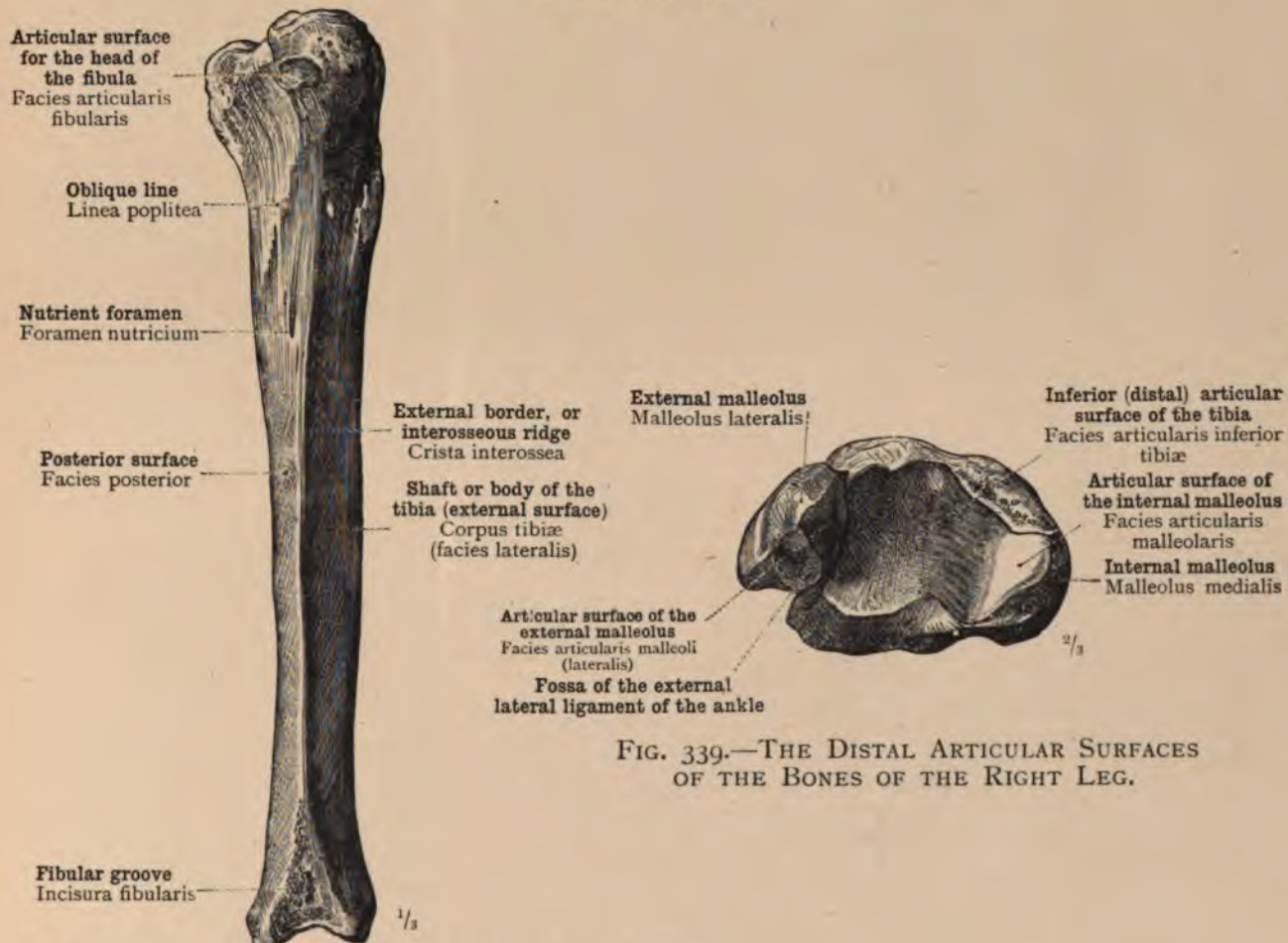


FIG. 339.—THE DISTAL ARTICULAR SURFACES OF THE BONES OF THE RIGHT LEG.

FIG. 337.—RIGHT TIBIA SEEN FROM THE OUTER SIDE.

Ossa cruris—Bones of the leg.

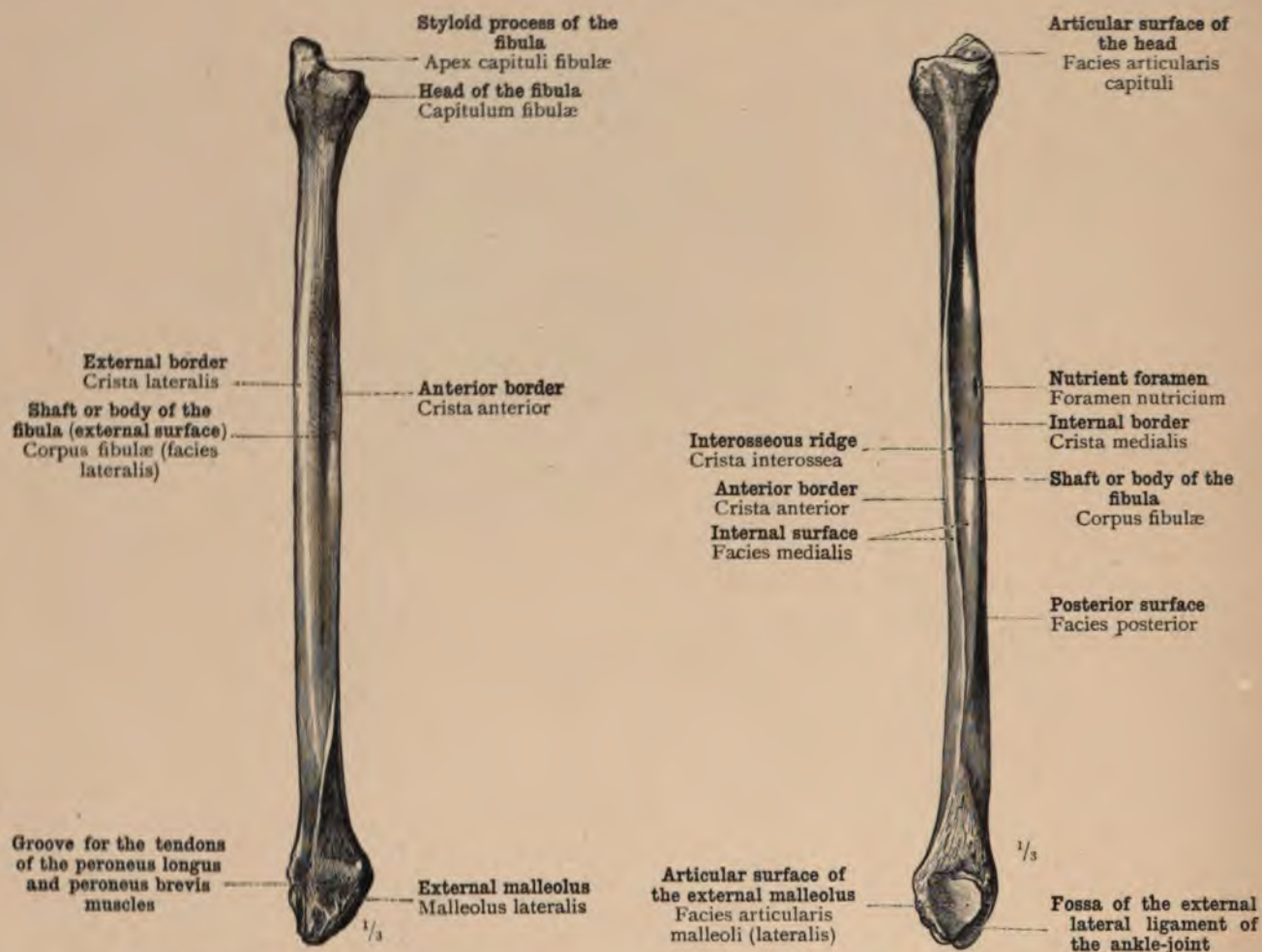


FIG. 340.—EXTERNAL ASPECT.

FIG. 341.—INTERNAL ASPECT.

THE RIGHT FIBULA OR PERONEAL BONE.



FIG. 342.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE BONES OF THE RIGHT LEG, WITH THE INTEROSSEOUS MEMBRANE.

Ossa cruris—Bones of the leg.

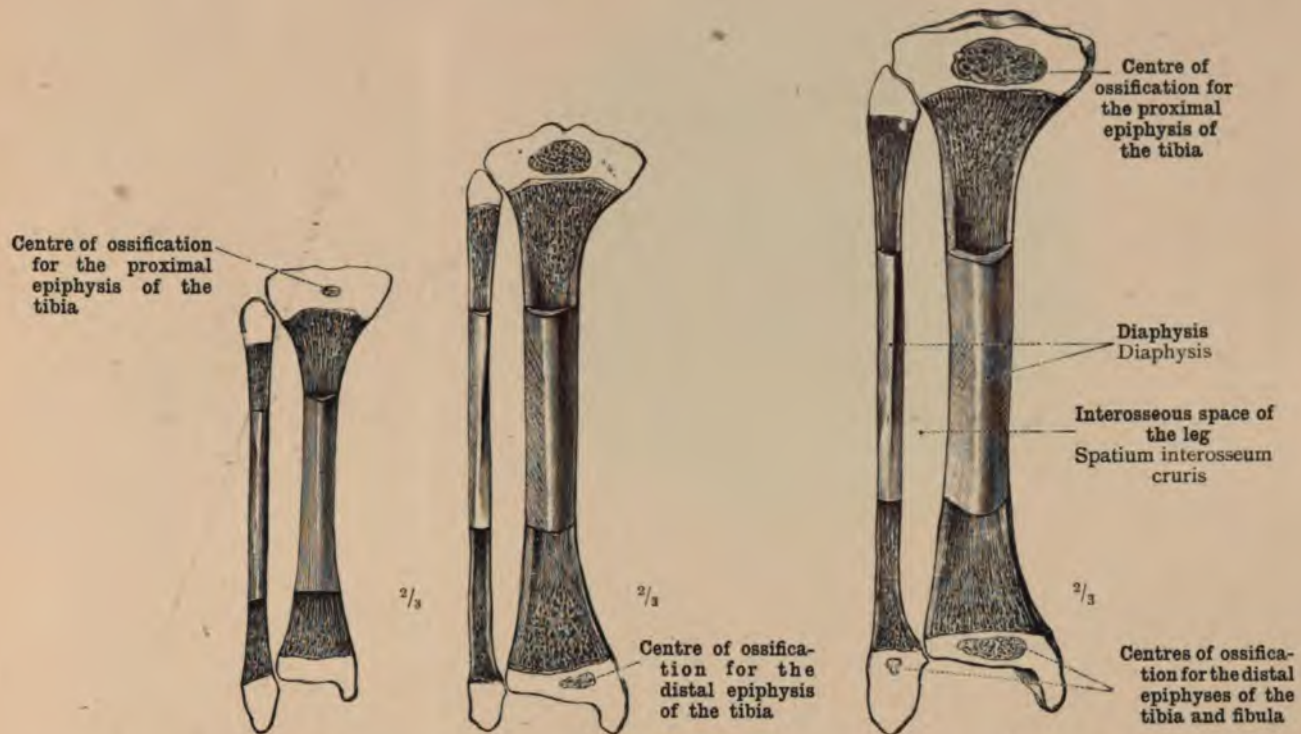


FIG. 343.—FROM A BOY STILL-BORN AT FULL TERM.
Body length, 21 inches.

FIG. 344.—FROM A BOY AGED NINE AND A HALF MONTHS.

FIG. 345.—FROM A BOY AGED ONE AND A HALF YEARS.

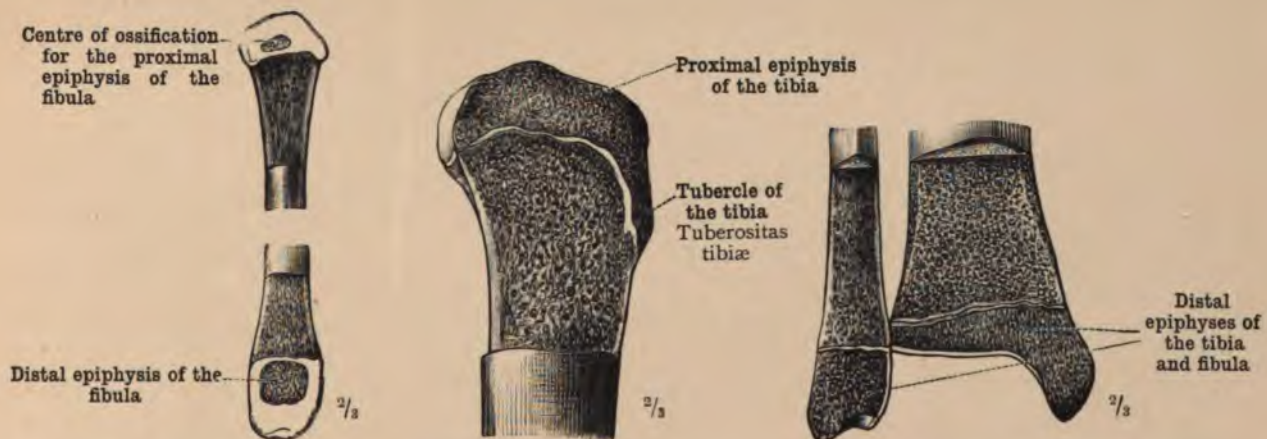


FIG. 346.—PROXIMAL AND DISTAL PORTIONS OF THE FIBULA OF A GIRL AGED FOUR AND A HALF YEARS.

FIG. 347.—PROXIMAL PORTION OF THE TIBIA OF A GIRL AGED FIFTEEN YEARS. SAGITTAL SECTION.

FIG. 348.—THE DISTAL PORTIONS OF THE BONES OF THE LEG OF A GIRL AGED FIFTEEN YEARS. FRONTAL SECTION.

Development of the Bones of the Leg.

18—2

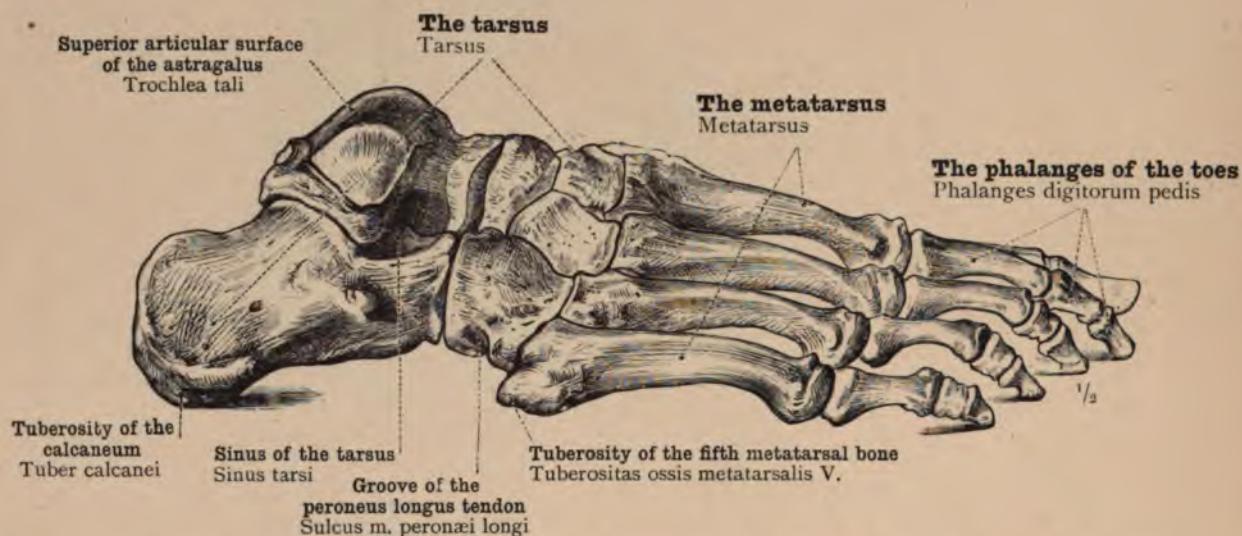


FIG. 349.—BONES OF THE RIGHT FOOT SEEN FROM THE OUTER SIDE: FACIES DORSALIS PEDIS ET MARGO LATERALIS PEDIS.

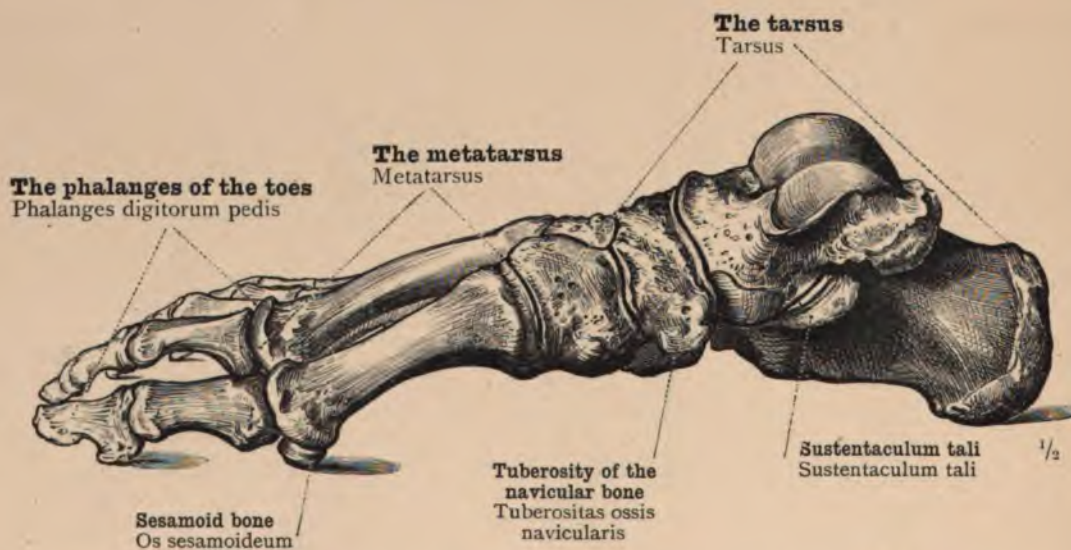


FIG. 350.—THE BONES OF THE RIGHT FOOT SEEN FROM THE INNER SIDE: MARGO MEDIALIS PEDIS.

Skeleton pedis—Bones of the foot.

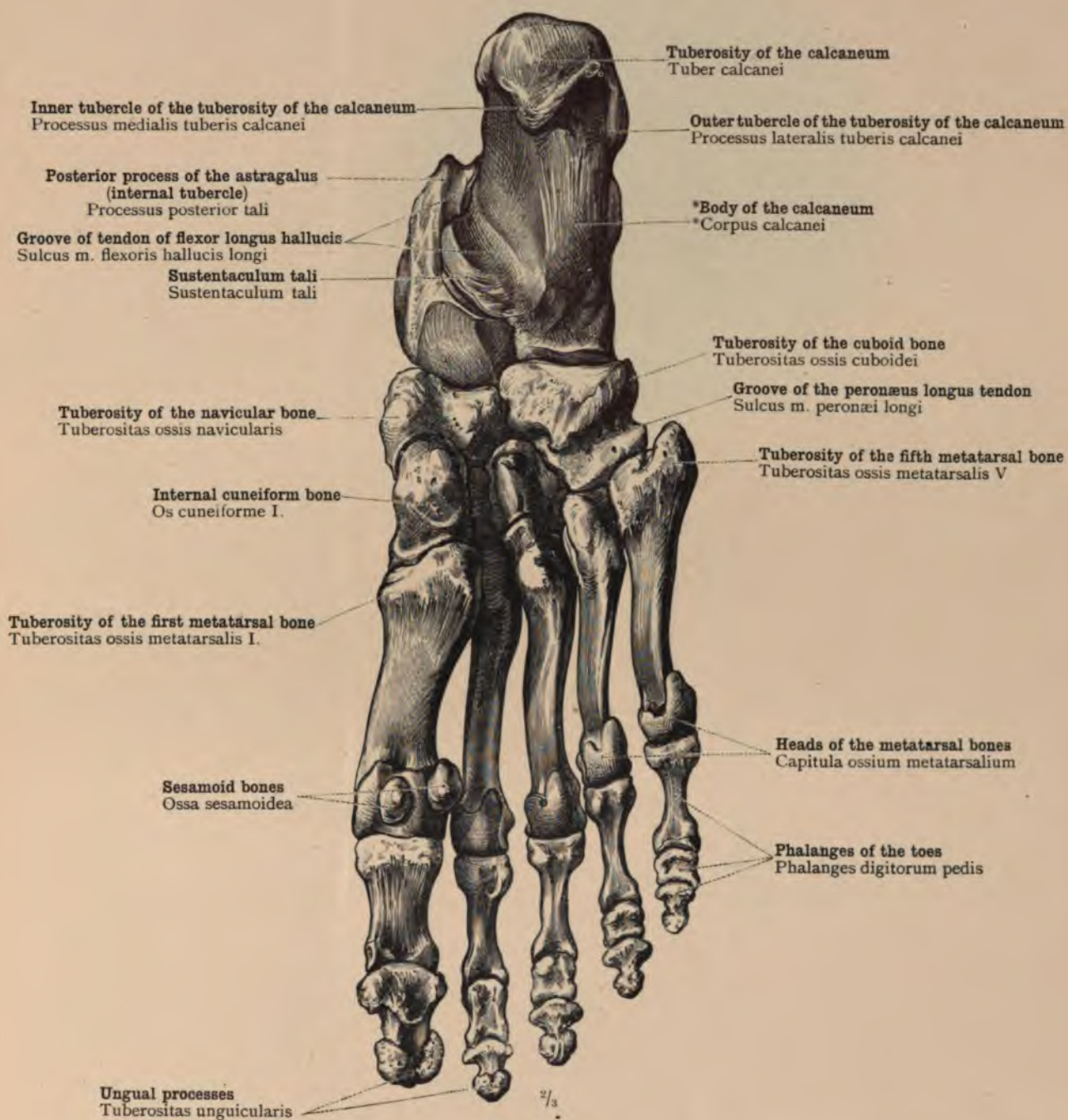


FIG. 351.—THE BONES OF THE RIGHT FOOT SEEN FROM THE PLANTAR SIDE: FACIES PLANTARIS PEDIS.

Skeleton pedis—Bones of the foot.

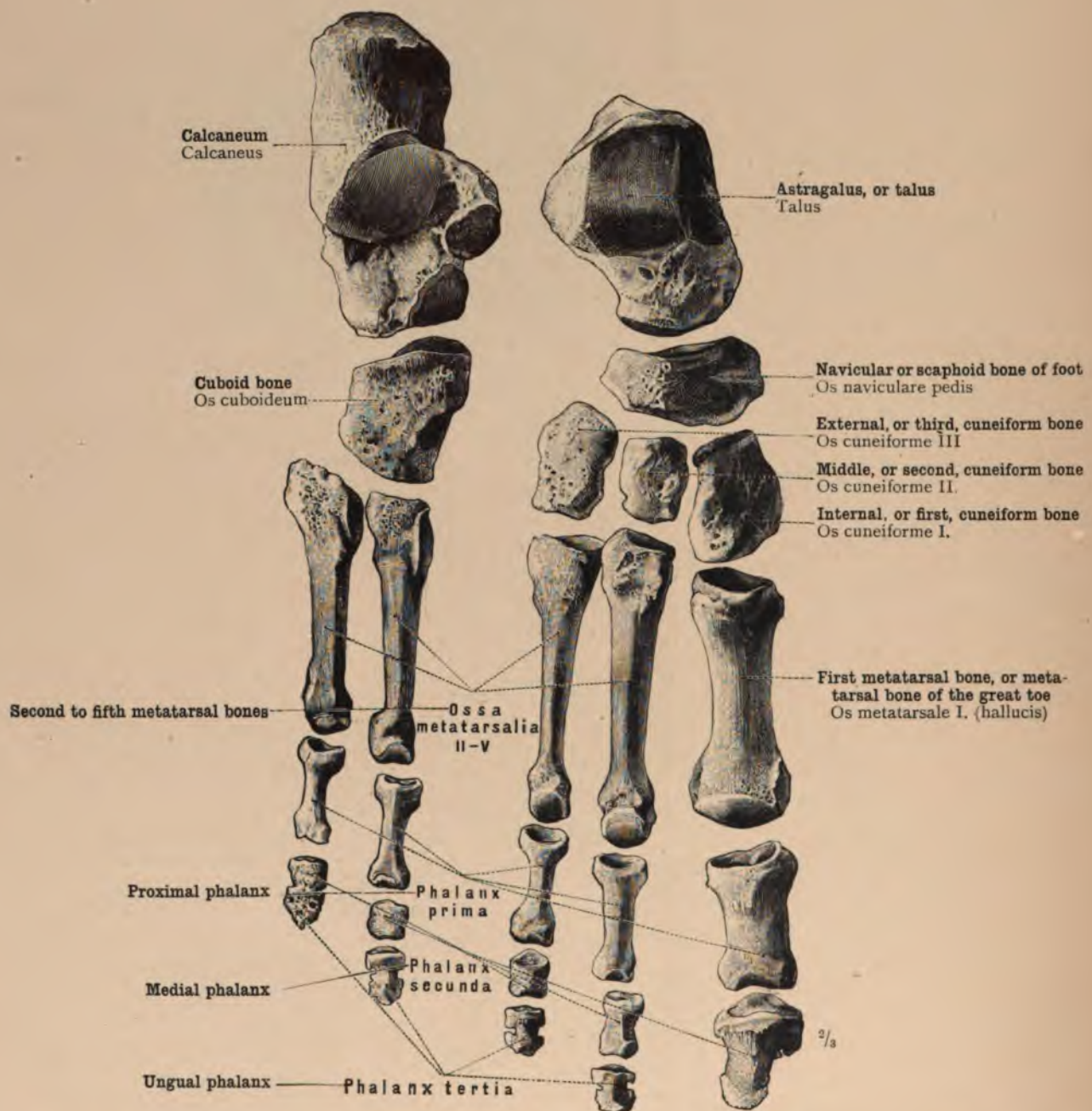


FIG. 352.—THE BONES OF THE RIGHT FOOT SEEN FROM THE DORSAL SIDE (ARRANGED IN TWO LONGITUDINAL ROWS).

Skeleton pedis—Bones of the foot.

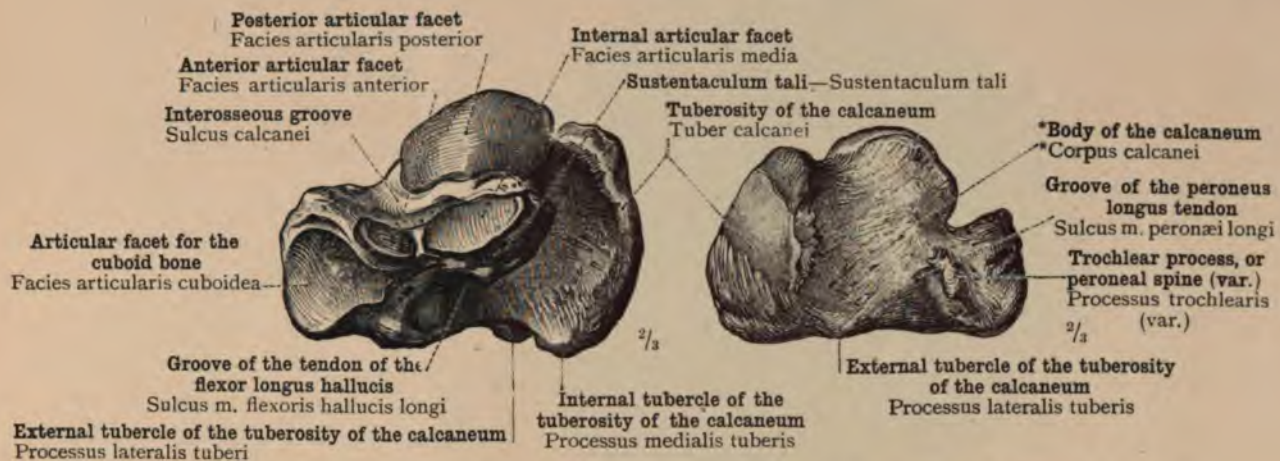


FIG. 353.—SEEN OBLIQUELY FROM WITHIN AND BEFORE.

FIG. 354.—SEEN OBLIQUELY FROM WITHOUT AND BEHIND.

THE RIGHT CALCANEUM OR OS CALCIS.

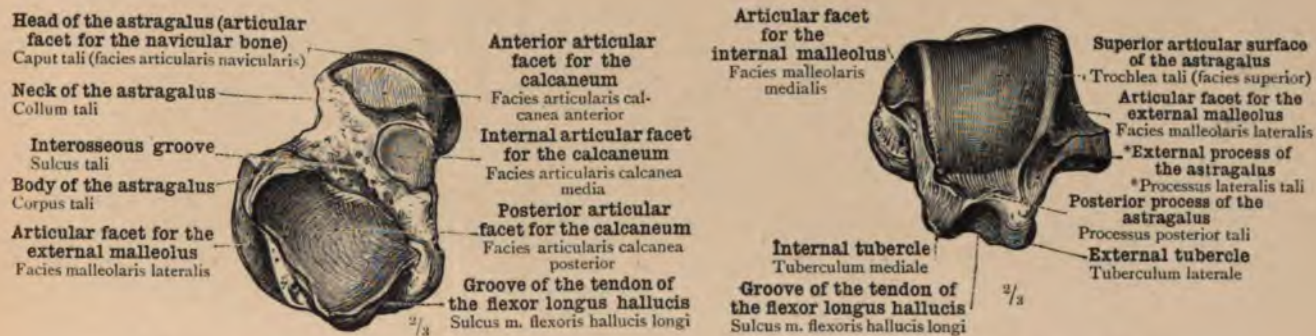


FIG. 355.—SEEN FROM BELOW.

FIG. 356.—SEEN FROM BEHIND.

THE RIGHT ASTRAGALUS.

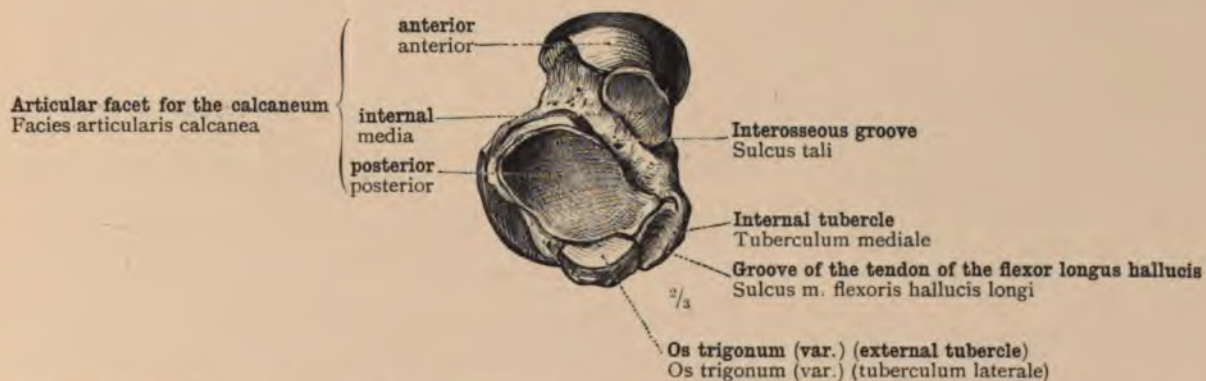


FIG. 357.—THE RIGHT ASTRAGALUS, WITH AN OS TRIGONUM (VAR.). SEEN FROM BELOW.

Ossa tarsi—Bones of the tarsus.

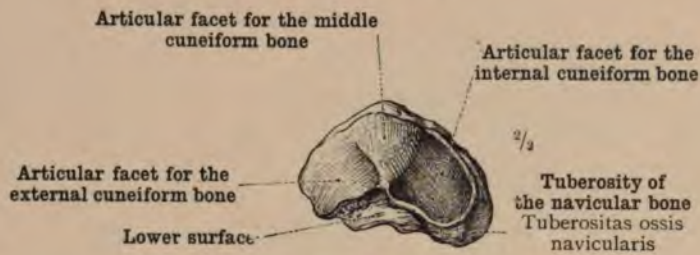


FIG. 358.—ANTERIOR ASPECT.

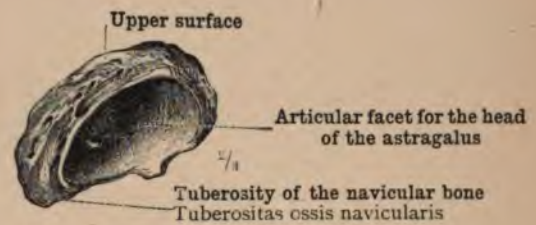


FIG. 359.—POSTERIOR ASPECT.

OS NAVICULARE PEDIS—THE RIGHT NAVICULAR OR SCAPHOID BONE OF THE FOOT.

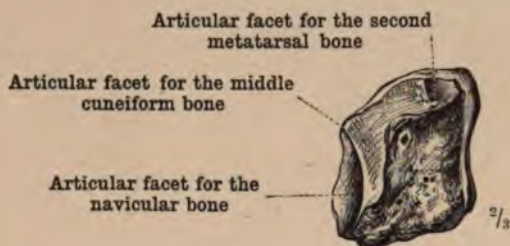
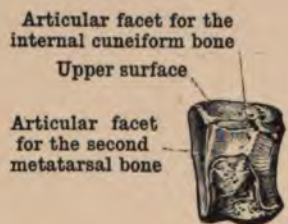


FIG. 360.—EXTERNAL ASPECT.



FIG. 361.—ANTERIOR ASPECT.

OS CUNEIFORME I.—THE RIGHT INTERNAL CUNEIFORM BONE.

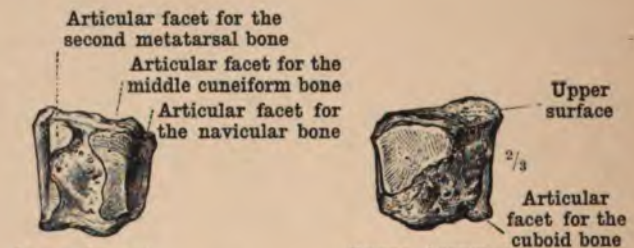


INNER ASPECT.



OUTER ASPECT.

FIG. 362.—OS CUNEIFORME II.—THE RIGHT MIDDLE CUNEIFORM BONE.



OUTER ASPECT.

FIG. 363.—OS CUNEIFORME III.—THE RIGHT EXTERNAL CUNEIFORM BONE.

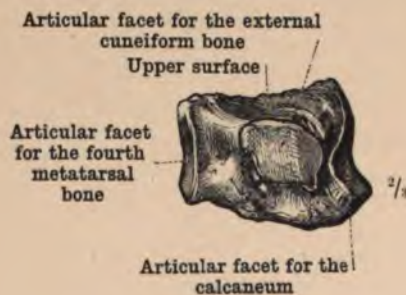


FIG. 364.—INNER ASPECT.

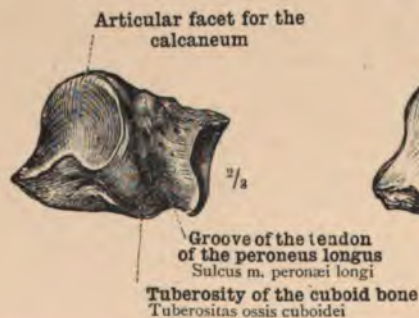


FIG. 365.—SEEN OBLIQUELY FROM WITHOUT AND BEHIND.

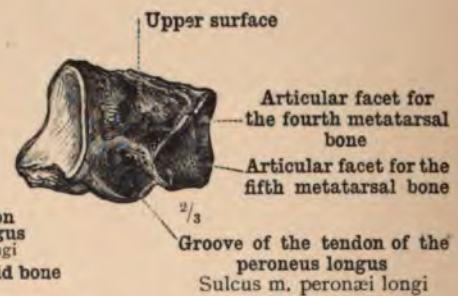


FIG. 366.—OUTER ASPECT.

OS CUBOIDEUM—THE RIGHT CUBOID BONE.

Ossa tarsi—Bones of the tarsus.

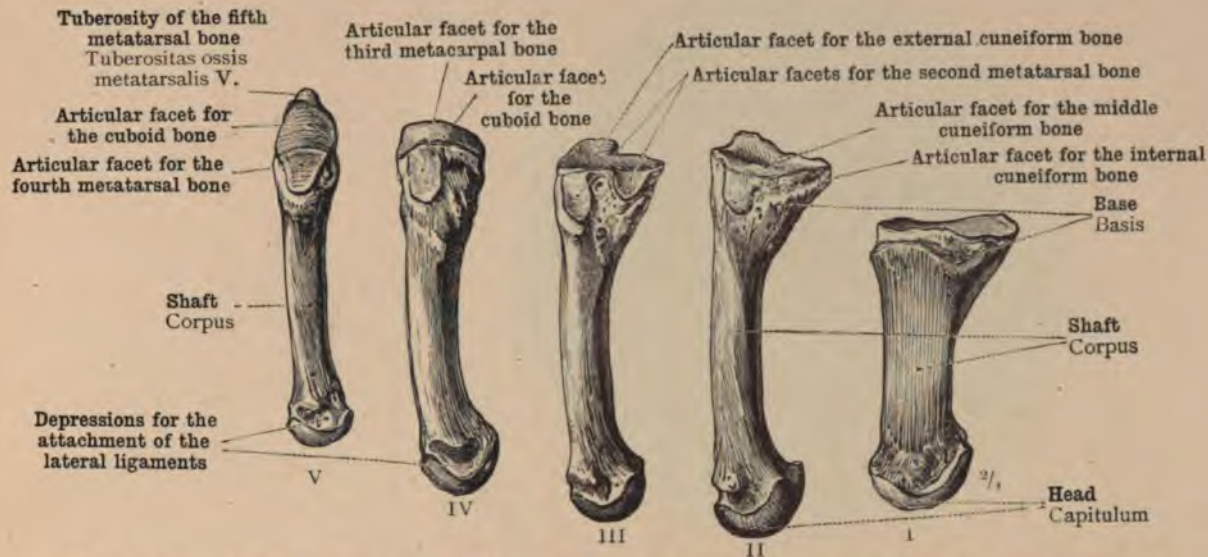


FIG. 367.—THE METATARSAL BONES OF THE RIGHT FOOT SEEN FROM THE INNER SIDE.

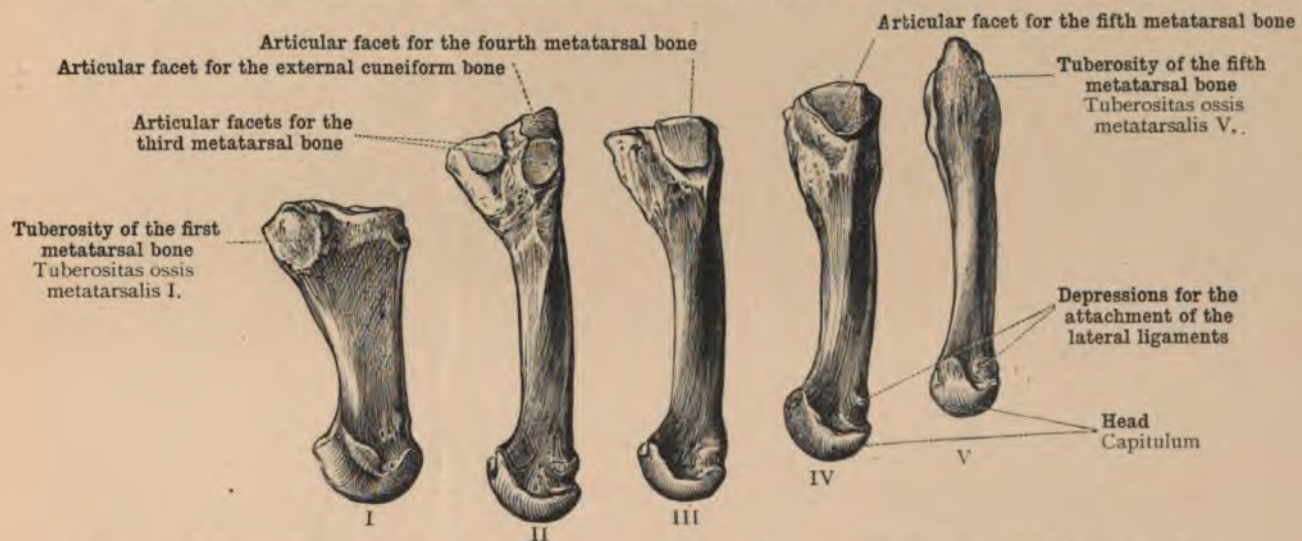


FIG. 368.—THE METATARSAL BONES OF THE RIGHT FOOT SEEN FROM THE OUTER SIDE.

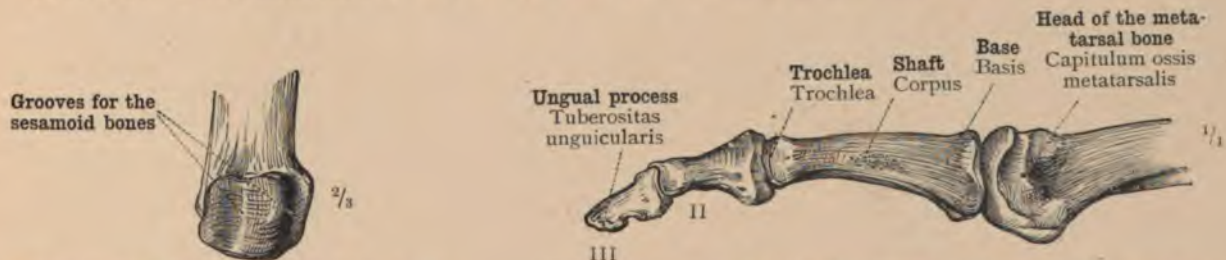


FIG. 369.—PLANTAR ASPECT OF THE HEAD OF THE METATARSAL BONE OF THE GREAT TOE (CAPITULUM OSSIS METATARSALIS HALLUCIS).

FIG. 370.—THE PHALANGES OF THE SECOND TOE SEEN FROM THE INNER SIDE (MARGO MEDIALIS DIGITI SECUNDI PEDIS).

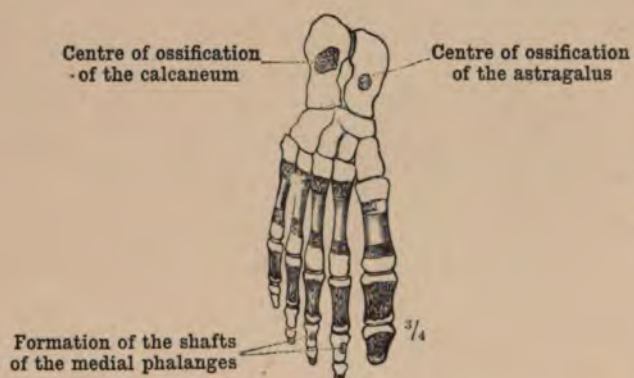


FIG. 371.—FROM A HUMAN FÆTUS IN THE MIDDLE OF THE NINTH MONTH (MONTHS OF FOUR WEEKS EACH).
Body-length, $17\frac{1}{2}$ inches.

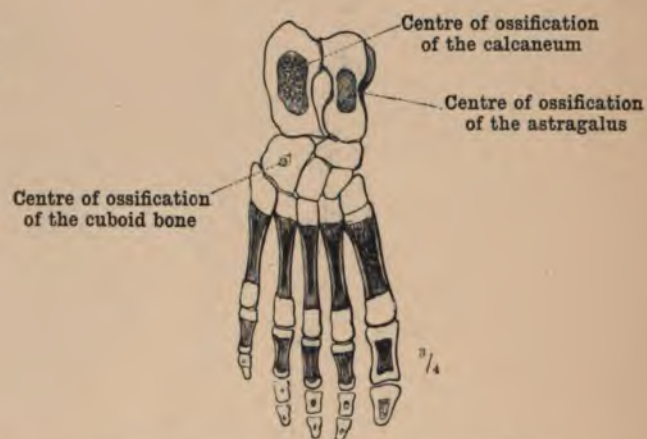


FIG. 372.—FROM A BOY STILL-BORN AT FULL TERM.
Body-length, 22 inches.



FIG. 373.—FROM A BOY AGED TWELVE WEEKS.

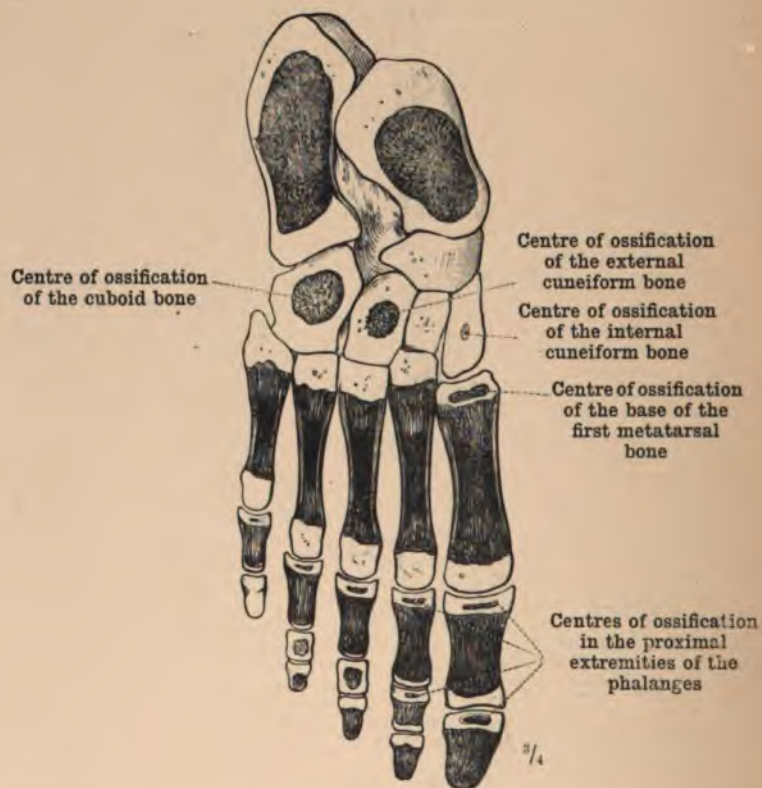


FIG. 374.—FROM A BOY AGED THREE YEARS.

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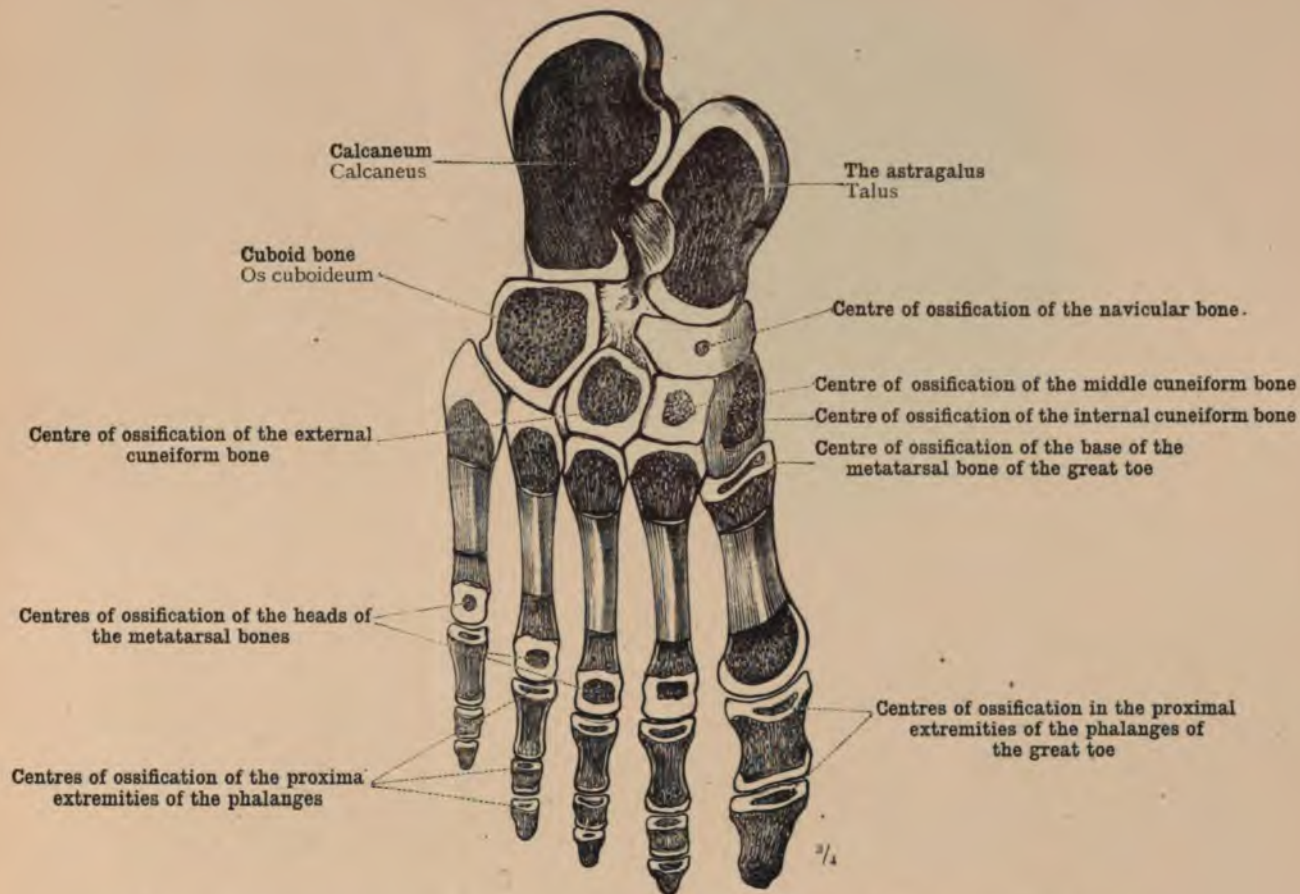


FIG. 375.—OSSIFICATION OF THE BONES OF THE FOOT IN A GIRL AGED SIX YEARS.

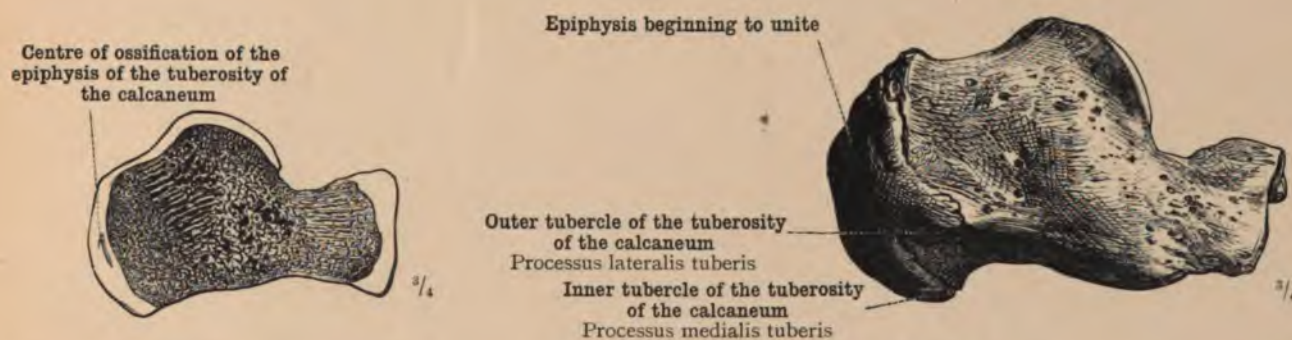


FIG. 376.—FROM A GIRL AGED EIGHT YEARS.

FIG. 377.—FROM A YOUNG MAN AGED EIGHTEEN YEARS (EPIPHYSIS BEGINNING TO UNITE).

EPIPHYSIS OF THE TUBEROSITY OF THE CALCANEUM.

Development of the Bones of the Foot.

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